Lilah Cuick.

TRANSACTIONS

OF THE

British Society for the Study of Orthodontics.

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ORDINARY MEETING.

An Ordinary Meeting was held at 11, Chandos Street, Cavendish Square, W., on Wednesday evening, January 8th, 1913, Mr. Montagu F. Hopson, President, in the Chair.

The Hon. Secretary (Mr. Harold Chapman) read the minutes of the Annual General Meeting held on December 11th, 1912, which were confirmed.

Mr. Shore and Mr. Arthur Smith were announced as visitors.

The President delivered his

Inaugural Address.

It has been said truly that it is more blessed to give than to receive. You have been good enough to confer upon me the highest honour, that it is in your power as members of this Society to bestow. I accept it with gratitude and in all humility, trusting that the blessings which may accrue to the donors will be commensurate with my appreciation of the gift bestowed.

But all honours carry with them certain responsibilities and entail the performance of certain duties; mine at the moment is the responsibility and the duty of delivering what is known as an inaugural address; and thus in a flash the tables are turned, I become the giver and you the recipients, not, alas, of honours, but merely of my poor words. Remembering, however, that "words are like leaves and when they most abound much fruit of sense beneath is rarely found," my remarks will be brief, yet I hope they will convey some indication of my interest in this Society, its welfare and its objects.

Under the fostering care of my predecessors and of their executive officers it has passed through the stage of infancy and may be regarded as a child representing a perfectly normal type, reflecting the greatest credit on its progenitors and those who have been responsible for its upbringing; in short, to complete my comparison, it has arrived at the critical age of six years, and we await the eruption of its first permanent molars in the sure and certain hope that they will eventuate in correct occlusion.

Those who were instrumental in founding this Society spent no small amount of time in selecting its title; I venture to think they chose wisely and well, for there is a modesty and liberality expressed therein which reveals strength. Recognising that a revolution in orthodontic treatment was in progress and realizing that this revolution was but a phase in true evolution, they determined to form a society for the "Study of Orthodontics." Men interested in this subject were gathered together, not to preach a particular dogma, but to investigate all, and thus by the interchange of ideas and of personal experiences become better equipped

to render skilled services to their patients, for that study is most useful which is capable of practical application.

As is always the case, efficient treatment must be based upon etiology, and consequently our investigations have led us back to "root causes" and we now know that mal-occlusion and malformed arches may be correlated with certain pathological conditions, and impaired physiological functions, operating from a very early age. We recognise, too, that the possibility of the union of two formerly segregated parental gametes may result in the reappearance of a suppressed abnormal type and that heredity as a factor in causation cannot be overlooked. Thus we have been tempted to submit new classifications, and we are agreed that our treatment must go hand-in-hand with that of other specialists; indeed, the practice of orthodontics demands an all-round knowledge, for it is truly wonderful what a wide dental field is opened up by a careful examination of a case of mal-occlusion. If I had to take one clinical case only to test a dental student's general knowledge, I should unhesitatingly choose a typical case, say, of superior protrusion at about the age of nine years, for there I should find in all probability a wealth of material sufficient for my purpose. There are still many things which are hidden from us. The actual dynamics of tooth eruption is a mystery. Of the causation of total displacement and complete inversion of individual teeth we know nothing. The forward movement of molars into a space in front of them we can in a measure understand, but the distal translation of a second premolar into the space formerly occupied by a first permanent molar is an enigma.

These are problems, small in themselves, perhaps, but which give us all furiously to think. In his valedictory address at our last meeting, Mr. Baldwin summarized many others remaining to be elucidated; these must be fresh in your memories, and we may regard them as his parting gift to stimulate us to further activities.

In orthodontics, as in other branches of medicine, we are alive to the importance of prevention, hence when the patients come under our care sufficiently early our efforts are directed towards the prevention of mal-occlusion, and they become, in this respect, "regulation cases," for we attempt to regulate the growth of the jaws and the eruption of the teeth.

We should all have our ideals, which are, after all, but our better selves, and which applied in our special work should deter us from shirking the best treatment because of the difficulties it may present. It is necessary, however, to remember that there is no routine treatment applicable to all cases, and unfortunately our ideal cannot be achieved in every instance, nor should it always be insisted upon. There is a proverb which says, "of all studies, study your present condition." This might be taken as a golden rule in orthodontics, for it is the starting point of diagnosis on which our treatment rests. But it is capable also of another application, often forgotten when seeking ideals, and yet it is of fundamental importance, therefore, I would urge the study of the present condition of the patient. It is brought home to me every week in my capacity as a member of the staff of a General Hospital with a large Dental Department. Before a patient requiring ortho-

dontic treatment reaches me his present condition has been investigated by one of the almoners, who ascertains, first whether the patient is eligible for hospital treatment, second if the child can attend as often as may be required, and third if the parents are able to contribute a small sum towards the expense. As a result of this enquiry, a large number of the little patients come to me with their charts marked "Cannot attend, cannot pay." Here then is a problem, the children cannot attend, because no member of the family can spare the time, that is to say the expense, to bring them to the hospital, and the parents cannot afford to contribute (the maximum is 5s.) towards the cost of the necessary appliance. When I read the remarks of extremists who descant on the criminality of extracting teeth for the alleviation of malocclusion, my thoughts revert to these same children and I know that however great the skill of these writers may be, they are ignorant indeed of how four-fifths of their fellow-beings live and of the pressing social problems that await solution. Such cases arise not only in hospital practice, but in varying degrees in all classes of private practice as well, and I venture to say that it is often a far more difficult thing to decide upon the best line of treatment by extraction—if you will—the treatment which will do the minimum of harm and the maximum of good—than merely to suggest the expansion of both arches and the bringing of all the teeth into normal occlusion. Whilst we look forward to the day when the number of these cases will be greatly reduced as a result of medical and dental treatment adequately rendered in the elementary schools, and the education of the masses on the subjects of diet and proper feeding, thus eliminating many contributory causes, we are still faced with the provision of treatment such as will achieve the best results under existing circumstances. Here, it seems to me, is a subject which the society might discuss with profit during the present session, particularly in its relation to the teaching of orthodontics in the Dental Schools. With a curriculum already overcrowded, with the requirements as to the amount of time to be allotted to certain subjects laid down in an arbitrary and unequal manner, the difficulties are great, but I am certain the day is not far distant when in every school the subject of orthodontics will be raised to its proper position and placed in the hands of teachers specially qualified to deal with it. Even then it will remain a subject worthy of post-graduate study, such as our Society affords.

Some of us in the rush of general practice have found it difficult sometimes to go beyond a certain point in our treatment of orthodontic cases, and in this we are aided and abetted by protesting parents and still more often by protesting headmasters and headmistresses, very real factors, as you will admit.

All honour be, however, to the man who presses forward and opens up new pathways. Enthusiasm is the leaven of our work, and as time goes on the lack of this enthusiasm is our greatest danger, hence it is well for those of us who are old fashioned and "old forties" to remember that the very means now adopted by us without demur were pioneer methods, and that not so long ago they were looked upon with scepticism and even ridicule.

Thus as progress carries us forward, our ideals advance with our greater knowledge, and our practice of them with increased opportunities.

In concluding these very general remarks, I would quote a passage from my favourite author (R.L.S.), which I have slightly modified for my purpose.

Ours is a work worth doing, and worth trying to do well. And so if I were minded to welcome any great accession to the number of our patients it should not be from any reason of increased fees, but because it was a work which was useful in a very high degree ; which every honest practitioner could make more serviceable to mankind in his single strength ; which was difficult to do well and possible to do better every year ; which called for scrupulous thought on the part of all who practised it and hence became a perpetual education to their nobler natures ; and which, pay it as you please, in a large majority of the best cases will still be underpaid. For surely at this time of day, in the twentieth century, there is nothing an honest man should fear more timorously, than getting and spending more than he deserves.

On the motion of Mr. Baldwin a hearty vote of thanks was accorded to the President for his admirable address.

CASUAL COMMUNICATIONS.

A Modified Badcock Screw

and

An Improvement in Buccal Tubes.

By Mr. W. Francis Mellersh.

Mr. Mellersh brought to the notice of the members a modification of the well-known appliance associated with the name of the first President of the Society. From constant use of the ordinary Badcock screw, it appeared to him that a slight modification would in certain cases be an improvement. It must often have been noticed by operators that the nut of the ordinary appliance was apt to be slipped by the patient. He therefore asked the Dental Manufacturing Company to make a somewhat smaller screw and substitute for the nut a movable part somewhat similar to that fitted to Ivory's separators.

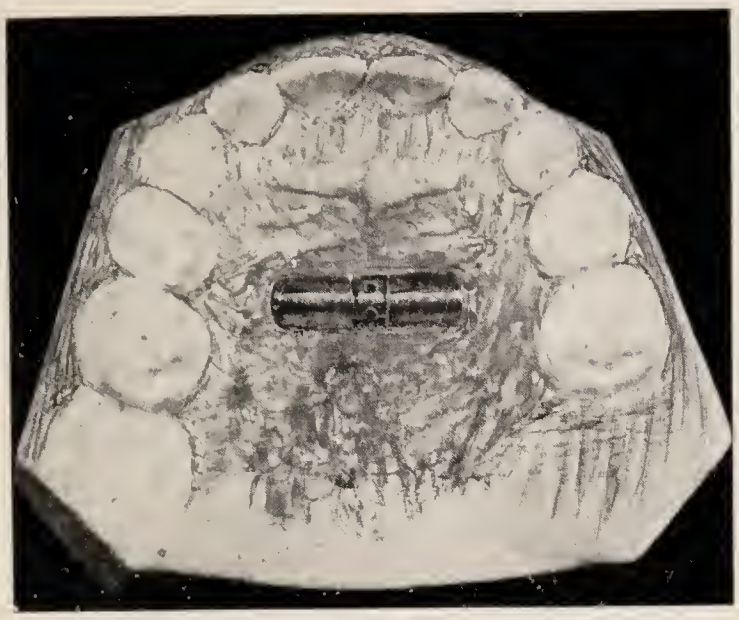
The holes in the circular portion by means of which the screw could be opened, the guide pin and the perforated circular part would be seen in the illustration. It took up less room in the mouth, and he found from actual practice it was not slipped by the patient. He hoped it would be considered an improvement.

He also wished to bring to the notice of the members an improvement for buccal tubes. The ordinary buccal tube was apt to cut the patient's cheeks and to chafe unduly. It occurred to him that if the ends of the tube could be rounded off in some way that difficulty would be overcome.

The new tubes were made with a boss at each end ; they worked extremely well, and he found patients preferred that form to the ordinary one. The tubes were made by the Dental Manufacturing Company.

Bands of the pattern designed by Mr. Jeffery were also exhibited and showed very well the modification of the ordinary buccal tube.

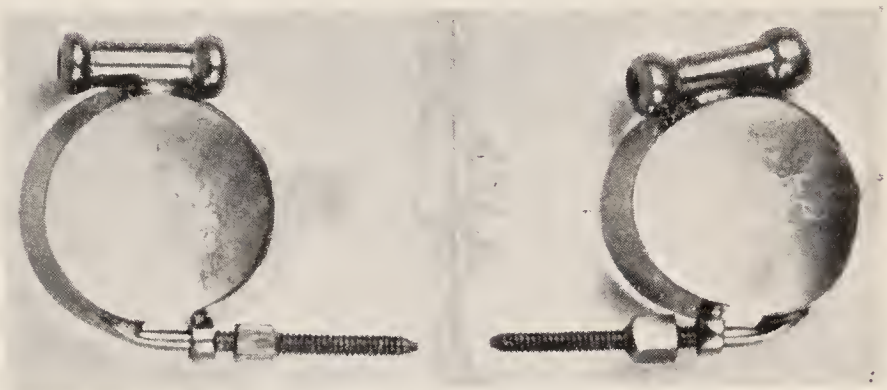
A Modified Badcock Screw and an Improvement for Buccal Tubes.



Screw fitted to palate preparatory to construction of gold plate

Finished appliance on model showing mode of attachment. The lever inserted in one of the holes of the screw indicates how expansion is obtained.

Improved Buccal Tubes attached to 22ct. bands, designed so as not to chafe or cut the patient's cheek.



Bands (Mr. Louis Jefferys pattern) showing the modification of the ordinary buccal tube.

To Illustrate Mr. W. Francis Mellersh's Communication.

An Impacted Deciduous Molar.

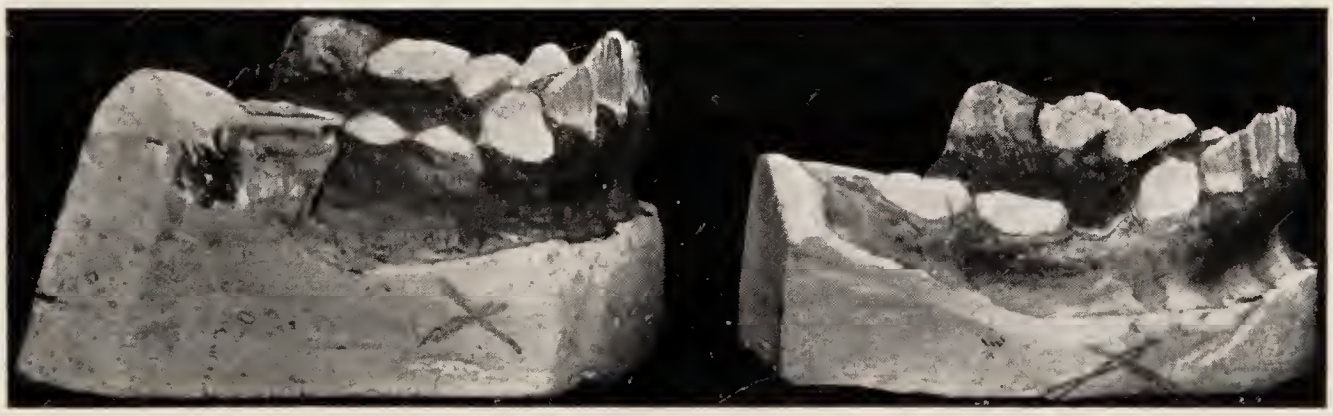


Fig. I. Fig II.

Fig. I shows premolar erupted after treatment.

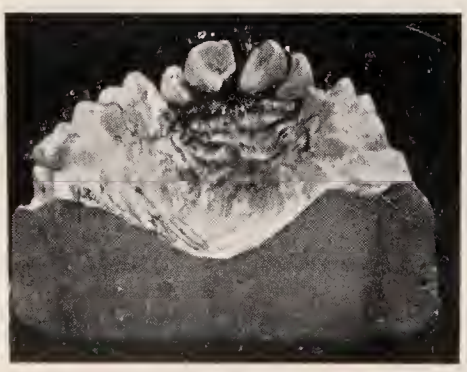
Fig II shows case before removal of crown of deciduous tooth, but after room was made for its eruption.

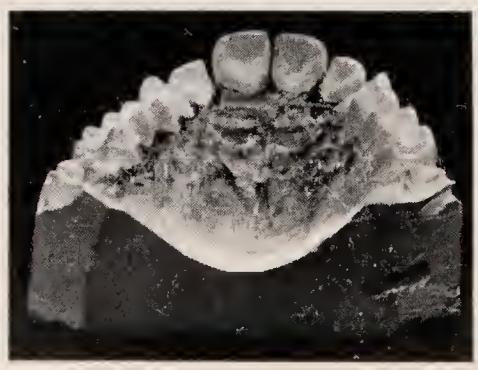
To Illustrate Mr. J. W. Doherty's Communication.

Case I.

In the upper the left lateral is erupting into the space where the odontome was removed. In the lower, the left incisory are directed upwards and outwards by the unerupted canine pressing against the lateral root.

Case I.—Skiagraph showing erupting lateral in the upper. In the lower unfortunately the left canine, lying in its crypt at right angles to the lateral root, is not seen in this photograph.





Case II.

Rotation of incisors, with disappointing results, when looked at upon the labial aspect.

They also were made by the Dental Manufacturing Company, who had carried out his suggestion in an admirable manner.

The PRESIDENT thought the two improvements that Mr. Mellersh had introduced were very useful. He believed the question of the modification of the Badcock screw was raised at a previous meeting of the Society by Mr. Spiller.

MR. BADCOCK thought the screw Mr. Mellersh had exhibited was very much smaller and less clumsy than the one he (Mr. Badcock) made himself. It had a right and left thread, a principle he abandoned a good many years ago in favour of the single thread, because he found the screws would slip back. He tried several devices to prevent that, and eventually he gave up the double thread, which doubled the tendency to slip, and substituted a single screw only. The pattern of the Badcock screw which was now sold contained a single screw only, and with a single thread the slipping trouble had to all intents and purposes disappeared. The screw was held quite firmly at the end at which it rotated in a little barrel ; it turned rather stiffly, and he found no trouble from slipping back. The notion of having the boss in the middle round instead of square occurred to him years ago, but he gave it up in favour of the square pattern for the simple reason that he thought the little pin or " tommy " that had to be used to turn the screw was a thing which was easily bent, whereas the square spanner could not possibly come to any harm. It was merely with the idea of making it as simple as it could possibly be made, and reducing the chances of accident as much as possible, that he adopted the square instead of the round form of boss. He thought the author had produced an exceedingly neat screw, which would do much more than his (Mr. Badcock's) could perform.

MR. GEORGE NORTHCROFT thought the present form of Mr. Badcock's plate introduced the principle which Angle found was so valuable in his friction nuts. Practically a friction sleeve existed, such as stopped the tendency of the rotation of nuts on the outside arches.

MR. SPILLER said that Mr. Clogg and himself had a somewhat similar modification to that described by the author made about six years ago ; but they were not able to get the screws well made by the Company to which they went. Therefore beyond getting the samples the idea was abandoned. Since that time they had tried once or twice to adopt a perforated tube instead of a nut, but they had now found that the ordinary Badcock screw answered the purpose so well that they had not attempted to make any further modifications. He thought when the Dental Companies had worked off their old stock of Badcock screws no further complaints would be heard about them. Formerly they were made in all kinds of metal, and some of them rusted in the mouth, although they were gilded very carefully. If practitioners asked for the latest pattern of Badcock screw, and were lucky enough to get it, it would be found that they did not slip back ; and if the angles of the square nut were reduced there was very little irritation of the tongue. He thought Mr. Mellersh's suggestion was a very excellent one, and he had no doubt there would be a very heavy demand for the modified screw he had suggested.

The PRESIDENT did not know whether any of the members had had experience of casting one of the plates, as the author had done, in two halves and then assembling them afterwards. It certainly looked very pretty, and it brought forward the whole question of the strength of cast plates.

MR. MELLERSH said he was not an advocate of the cast plate in the ordinary course of work, neither was he an advocate for the use of

vulcanite in the mouth except for the purpose of attaching artificial teeth to metal bases. He much preferred a metal plate. He had used a large number of plates of that particular pattern, and had experienced no difficulty on the score of fracture. They were perfectly practical in every-day work. The screw was not a gold one, but nickel.

Mr. Baldwin said that he always made Mr. Badcock's screw arrangements in his own workroom. They were made with rather thicker wire, and with one perforation in the middle of the screw instead of the square nut, using a steel "tommy" which did not bend. The bosses on the ends of the tube exhibited by the author would, he thought, be especially useful when it was desired to put on the band before putting on the bow. It was then that the cheek was apt to be irritated for a day or two, and that kind of tube with a boss on it would be very much more comfortable. He did not know whether when the bow was on there was any great advantage in it. He did not find any irritation at all on the cheek when the whole apparatus was fixed. He had had some experience of having regulation plates cast of silver and then heavily gilded, but he did not think there was any advantage as a rule in them over the ordinary plate. The advantage sometimes of a metal plate was that little bits could be soldered to it if one desired to do so at any time during the progress of the case.

Mr. Visick thought that, with the use of the suggested boss tubes on the lower teeth, there would be a very good chance of the occlusion being destroyed. He found that, even with ordinary angle tubes, unless the tube was put very low down on the band close to the gum, if there was much overbite in the molar region the upper molar came down on the tube and bent it. He fancied that the boss would get still further in the way of the occlusion, and would necessitate putting the tube so low on the band that it would injure the gum on the buccal surface. It seemed to him that, as the posterior buccal cusp came down over the back of the lower molar, it would impinge on the thickened part of the tube.

Mr. Lacey said the molars on the specimen passed round were so shallow that it would be impossible to get ordinary bands on them, but the new type of tube was no more in the way than the ordinary buccal tube.

Mr. Spiller suggested that the author should consider the advisability of having the tubes supplied separately, as he thought the best fit would be obtained if the plain bands were burnished first and the tube soldered on afterwards.

Mr. Northcroft pointed out that the bands shown were the old pattern open bands, and he thought it was most important that practitioners should get into the habit of using all-closing bands in such cases. He suggested that the author should tell the Dental Manufacturing Company to use all-closing bands.

Mr. Badcock said that since he previously spoke he had had the opportunity of seeing the plate, and he desired to congratulate the author on the beauty of his arrangement, which he thought was a very great improvement.

Mr. Lacey thought that when the pressure was kept up in the vulcanite plate there was a certain amount of inflammation of the mucous membrane on either side, particularly in the molar region at the back of the plate. Vulcanite seemed to cause much more irritation than gold.

Mr. Badcock said that he attributed that to the pressure rather than to the vulcanite, or else to the fact that the patient had not kept the appliance quite clean.

Mr. Harold Chapman said he was much interested to hear the author say that the tops of the bosses caused no irritation to the cheeks whatever, although it hardly seemed to him that that could be possible.

Mr. Mellersh said he did not intend to convey that impression ; he meant that he hoped they would cause the minimum of irritation.

Mr. Chapman, continuing, said he had found that considerable relief could be given by bevelling off the distal end of the tube on the cheek side. That would not present the difficulty as regards occlusion to which Mr. Visick had referred, and which he thought must certainly happen. The tube would be squashed out of place in a very short time, and if it was kept down low enough he thought it would impinge on the gum. He did not see any object in having the boss on the anterior end of the tube unless it were for a short time, because the nut coming against that afterwards would prevent irritation, as that could be bevelled at the mesial end. He was not sure that it would not be better to have the distal end of the tube itself bevelled and turned right over, and never allow the arch to project right through. That might get over the difficulty, except that one would have to use a slightly shorter length of arch within the tube, but in many cases that was not a serious disadvantage.

Mr. Stephens asked the author to explain how he got the screw away from the two halves of the gold plate which he had cast without mutilating the wax.

Mr. Mellersh, in reply to Mr. Stephens' question, said the wax pattern was made, the plate cast in two halves, and then the Badcock appliance was cemented in place afterwards. He quite agreed with what Mr. Northcroft said in regard to the pattern of angle bands. He merely asked the Company to make up some for the purpose of the demonstration.

An Impacted Temporary Molar.

By Mr. J. W. Doherty

Mr. Doherty exhibited some models showing apparently an impacted first temporary molar. When the child was first examined there was a peculiar lack of development on the right side in the lower jaw. The permanent canines had erupted, the second temporary molar was standing, and the six-year-old molar had also erupted. When he first saw the case apparently the first temporary molar had been extracted, and appearing just through the gum was what he took to be the cusp of the first premolar about to erupt. As the canine was overhanging it somewhat and also the second temporary molar was preventing it from erupting, an arch was put on, the canine was moved back, the molars were put back and plenty of room was made. The case was then left to allow the tooth to erupt. After six months, however, no alteration had taken place. On making a careful examination of the patient's mouth, the probe slipped into what appeared to be a cavity in the crown under the gum. It was of such a depth that it led him to believe also that the tooth was dead, because the probe went in half an inch. On packing the gum away so that he could see what the condition was, a close examination revealed the fact that there simply remained in the cavity the crown of the first temporary molar all absorbed away, except the enamel part of it. After six months the premolar made its appearance, and the second slide showed it as it came through. He did not remember hearing of such a thing before. He did not see how the first temporary molar got down there, because it should have erupted before the second temporary molar and also before the permanent canine.

The PRESIDENT remarked that the case was a very interesting one. He believed Mr. Lewin Payne showed a similar case a month or two ago.

MR. SCHELLING suggested it might be a solution of the problem that the temporary molar had never been completely formed. It was simply an enamel cap without roots.

MR. BALDWIN said he had seen many cases where the first lower temporary molar had been impacted, and the masticating surface had been on the level of the gum between the permanent canine in front and the second premolar behind, but he had never seen a case like that shown, where the first temporary molar was impacted between the second temporary molar and the canine. It was quite unique as far as he knew.

MR. RUSHTON said that the interest of Mr. Lewin Payne's communication a month or two ago was that it referred to an upper and not a lower jaw.

MR. G. THOMSON enquired whether Mr. Doherty could state if there was any delay in the eruption of the four temporary molars.

MR. DOHERTY, in reply, said that he could not get any history of the case at all. As far as the parents knew everything was quite normal. He was sorry he had not got a skiagram of the case, but he saw no need for it because he did not doubt for a moment when he saw the cusp appearing that it was the premolar, and he therefore waited for it. In regard to Mr. Schelling's question, as far as he knew the teeth and the roots were quite normal

A Case with Unusual Complications.

By MR. H. E. MARSH.

MR. H. E. MARSH exhibited the models of a case (Case I) which he stated occurred in the practice of Guy's Hospital in 1911 under the care of the President. It exhibited singular features in each jaw. In the maxilla there was a follicular odontome, which Mr. Hopson operated on, and the model showed the lateral tooth coming down into the space. The lower was more interesting from an orthodontist's point of view. Looking at the model it would be seen that the lower left central and lateral had their axes not vertical, but passing upwards and outwards as though there were pressure upon the root of the lateral pushing the root towards the median line, the pressure being carried through the tooth and exerted upon the root of the central as well.

The skiagraph showed the cause of the condition. If it was closely inspected it would be seen that the canine was lying in its crypt deep down in the bone, with its axis practically at right angles to the axis of the lateral in the lower jaw. Personally he had never seen a case like that before ; it was very unusual, but he had no doubt that practitioners senior to himself might have seen a similar one. The case was really the President's, and it was characteristic of Mr. Hopson's generosity that he had allowed him to bring it before the notice of the members. Mr. Hopson also allowed him to show some models of another case which he thought might be of interest.

The left-hand model (Case II) exhibited represented the maxilla in a case where the two jaws were in normal relation to one another as far as occlusion went, but the incisors had very much rotated. The right-hand model showed the case as far as he was able to finish it. He brought it forward because it was what he called an extremely disappointing case from the practitioner's point of view, and the patient's

and the parents' as well. When the case was first attempted it would be seen that the centrals had erupted more than the laterals ; but when he had finished rotating the centrals and the laterals it would be seen that the axes of the laterals, particularly the right one, were directed very much outwards. There had been a great deal of rotation to be done ; it was a very bad case of torso-occlusion. What he hoped would happen was that the laterals would erupt further, but he found it extremely difficult to put a retention on after rotating the incisor teeth, which would allow them to continue to erupt. In speaking to the Hon. Secretary about cases of that sort Mr. Chapman said that by putting bands on adjacent teeth, such bands having additions of plate soldered to them so that the buccal and lingual surfaces of the tooth would be made parallel to one another, and carrying a small wire in front and behind these teeth from a band on the rotated tooth, this could now erupt between the wires or spurs without any fear of a relapse, but he found it extremely difficult to keep the rotated teeth from returning to their former twisted position.

The PRESIDENT said he had not a great deal to add to what Mr. Marsh had said regarding Case I. It would be seen that in the maxilla the left central incisor was missing. That occupied a dentigerous cyst of some considerable size, which he opened and from which he removed the tooth, and the lateral incisor could be seen coming down. Since the lower case had been out of Mr. Marsh's hands, he had deemed it wise to extract the left lateral incisor in the lower jaw. Both the centrals started to lean over to the left ; they had been pulled up into a straight line, and they were now fixed there with a retention. Certainly the canine had moved, its point was starting to spring forwards, so that he had every hope about the ultimate appearance of the canine. If it could be brought near the surface, so that some attachment could be put on to it to help to pull it up into place it might do some good ; but it was rather a hopeless sort of case, as the upper central incisor had been lost as well.

MR. GEORGE NORTHCROFT enquired whether there were any signs of absorption of the root of the lateral incisor, against which the lower canine seemed to be pressing, as far as he could understand the radiogram.

The PRESIDENT replied that there was no absorption, although he was rather expecting there would be. He was pretty certain there would have been if he had started to pull it up into line while the canine was still there.

MR. GEORGE NORTHCROFT said it seemed obvious that the best treatment was followed under the circumstances.

The PRESIDENT said they had all seen cases where there had been a canine, usually a maxillary canine, impinging on the root high up of the lateral incisor, and any attempt to pull that lateral incisor into position was very frequently followed by a considerable absorption of the root of the lateral. He believed such cases had been brought before the notice of the Society.

MR. THOMSON suggested that, in order to encourage the eruption of the canine, a plate should be worn over the gum to bring pressure on to the gum. He had seen a number of cases where a tooth was erupted much more quickly through a plate being put into the mouth on which the patient could bite hard on the gum. He thought it would be found that the reason the teeth did not erupt was due to the want of pressure from above.

MR. LACEY enquired whether the author treated Case II. with an Angle's band or with an expansion plate.

Mr. Marsh replied that it was done with an Angle's arch and spurred bands on the incisors.

Mr. Lacey thought that was a faulty method to adopt in such a case. It seemed to him that space was wanted in the suture of the maxillæ and an Angle's band, unless it was very carefully treated, did not move the apex of the root. It was necessary to wait a considerable time afterwards for the root to come into proper line. The advantage of an expansion plate was the fact that one got the space higher up in the maxilla, with the result that in cases of crowded laterals a straighter lateral was eventually obtained. It seemed to him that a better result might have been obtained by first using an expansion plate than by the use of an Angle's band only.

Mr. Chapman asked Mr. Lacey whether he would rotate the teeth in the same way as Mr. Marsh had done, or would he employ a different method.

Mr. Lacey said it was not so much a question of rotation as that he wished to emphasise the importance of bringing the roots into proper alignment before rotation. The author said it was rather a disappointing case.

Mr. Chapman said he simply wanted to know whether Mr. Lacey would rotate the tooth with a removable appliance or a fixed one.

Mr. Lacey said he would certainly prefer a fixed appliance ; it was seldom that a satisfactory result could be obtained with a movable one.

The President remarked that in the communication which Mr. Morris read at the last meeting the apices of the roots of the teeth were moved first of all by means of a Case's appliance and then rotated afterwards.

Two Cases of Expansion without the Use of Direct Force.

By Mr. Harold Chapman.

Mr. Chapman said the case he exhibited was one in which a small amount of expansion was required, but he was not quite sure how to bring it about, as he did not want to make an expansion plate or put on an arch. The bite was exceedingly close. He gave the patient a biting plate, and after some time to his surprise he found that the premolar and molar region had widened considerably. On measuring the sulcus of the second premolar it was found that the width in the first model was 38·5 mm. and in the second model 41·6, showing that the case had expanded 3·1 mm. without any appliance to actually bring it about, except the wearing of a biting plate.

The second model illustrated a case in which the expansion occurred in the lower jaw without any appliance being used for the purpose, although in that instance the expansion was less. It was a Class I. case, in which he wanted to get expansion of both the upper and lower jaws. As there was lingual occlusion on one side he decided that the upper must be expanded first and for that purpose he used a Badcock plate, which was not a success, owing to the patient not wearing it. He then put on an arch, and when he had got the lingual molar into its proper bucco-lingual relation he put in a lower Badcock plate, which had been made at the same time as the original upper plate, and found it was considerably too small. He used the word "considerably," although the difference only amounted to 1·5 mm., because he considered it correct under the circumstances. The expansion had occurred

solely on account of the occlusion of the upper and lower teeth, without any appliance being put in to do the work.

Mr. Baldwin thought that, without the use of a plate, the expansion would not have occurred. He did not think the expansion was due to growth at all. In his opinion the teeth on erupting further and bringing a wider portion of tooth in contact with the plate were bound to be directed outwards. The teeth went on growing and the more bulbous portions of the teeth by the pressure of their inclined planes on the plate were bound to go into a more expanded position. In the lower, the expansion was due to the occlusion of the cusps of lower teeth against those of the expanding upper ones, but he did not think any of the expansion would have taken place without the plate. He had frequently noticed a biting plate produce expansion in this way.

Mr. Thew said he had often wondered to what extent cases would right themselves if they were not interfered with, and whether practitioners were not working side by side with nature rather than assisting it. He discussed that particular question with Mr. Badcock in dealing with a certain case in which the jaws had been expanded, and enquired whether in his opinion much, or any, of the expansion which was obtained would have been produced by nature unaided. With the idea of finding out what would have happened, he looked up the old models of the case, and found that in two and a half or three years previous to treatment no expansion had occurred which could be measured with callipers ; whereas in three, four or six months from the time of treatment there had been an expansion of $\frac{1}{8}''$. That was very instructive to him and removed some of his doubts as to whether practitioners were doing much good of any sort in regulation cases.

Mr. Chapman, in reply, said he was glad to know that Mr. Thew was more satisfied that he was doing real good than he had been previously.

Mr. Northcroft thought the Transactions of the Society would be of very little value if they were not accompanied by illustrations. While the epidiascope was very convenient for the exhibition of models, the value of the illustrations would be lost unless the members went to the trouble of having photographs made of their exhibits. That was done at the expense of the Society, if the contributors would only take the trouble to let the photographer have the models. He appealed to the Council to make a ruling on the matter as soon as possible, so that some definite arrangements might be carried out.

Mr. Rushton suggested that the Council should discuss the matter in all its bearings at the next Council Meeting.

The President said there was no doubt the value of the Transactions would be considerably impaired if communications were not properly illustrated, and he assured the members that the matter would receive the very careful attention of the Council at its next meeting.

The President then adjourned the meeting to Wednesday, 12th February.

ORDINARY MEETING.

An Ordinary Meeting was held at the Rooms of the Medical Society of London, 11, Chandos Street, Cavendish Square, W., on Friday, Feb 14th, 1913, MR. MONTAGU HOPSON, President, in the Chair.

The Minutes of the last meeting were read and confirmed.

Mr. H. D. Shore, L.D.S., Eng., 30, Mount Nod Road, Streatham, S.W., was balloted for and duly elected a member of the Society.

Mr. H. D. Shore and Mr. D. M. Shaw were present as visitors.

MR. W. RUSHTON brought forward a case of

Retraction of Prominent Incisors after Extraction of Four First Premolars.

The case was one of a girl twelve years of age, who had first visited him in November, 1909. There was no distinct history of mouth-breathing or thumb sucking, but the girl had broken her nose some years previously, so he thought there must have been a certain amount of mouth-breathing. At any rate her teeth, especially the upper ones, were too prominent (Fig. 1a), entirely spoiling the profile. In November, 1909, he extracted the two lower first premolars and put in an appliance to retract the six lower front teeth. That appliance was worn until the following February, at which time the lower front teeth had been retracted. In the February he extracted the two upper canines. Those were retracted by July, when he put in a plate to retract the incisors and the case was finished in November (Fig. 1b); that was to say, one year from start to finish.

The latter model he had lately taken, and it showed that the front teeth remained in excellent position. The profile was as good as one would wish to have it, and the teeth were left in a state of stable equilibrium. There was no tendency for them to return to their former position, and he had little or no doubt that the small gap would close as years went on.

The remarkable part of the case was that although he had not set out to do anything elaborate, his intention merely being to improve the girl's appearance and at the same time to leave her with functional teeth, yet it would be seen that although the occlusion in the former case was post-normal, in the finished case it was normal. It would also be noticed that there was no tendency to an overbite; that was to say, the bite evidently had been somewhat raised, and at the same time the lower teeth had come forward more rapidly he should say than the upper ones. There might be some other explanation of it, and if there was he would be glad to hear it. The principal and most satisfactory result of the case to his mind was that the front teeth were in stable equilibrium and showed no signs whatever of tending to revert to their former protruding position.

Mr. J. G. TURNER said he could not see the post-normal occlusion which Mr. Rushton had referred to in his first models. He would like to ask Mr. Rushton if he had used plates which opened the bite in the

(a) Fig. 1. (b)

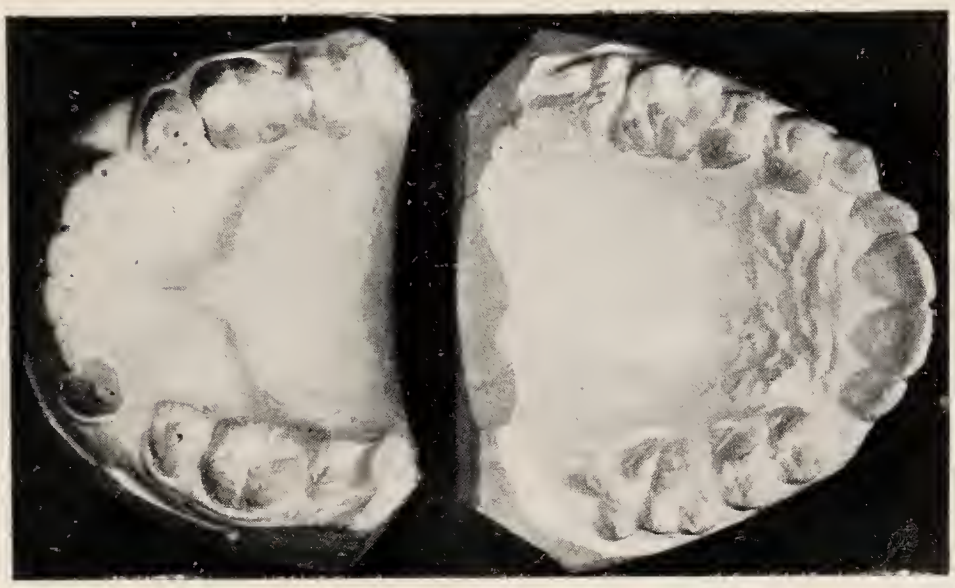


Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6 (a).

Fig. 6 (b)

treatment. If so that would account entirely for the alteration in the molars, in that the molars would rise. When that occurred one might always expect the lower jaw to bite more forward than it previously did.

MR. NORTHCROFT said it was surely the case in elderly people that where the molars had been lost the lower jaw came forward when the bite was shortened, and therefore if the bite was elongated one would expect the reverse to take place.

Mr. J. G. TURNER, in answer, said that the lower jaws of edentulous people continued to bite upwards on a radius of an arc, centred in the glenoid cavity, and had no connection with the jaw coming forward or being brought forward when the bite was opened by reason of the molars rising. When the normal occlusion plane was passed the chin came forward because the point from which it worked was higher up than the point of the chin, so that if the chin came upward it necessarily came further forward.

MR. RUSHTON said the point was that if that were the case how did the jaw of his patient come forward.

MR. J. G. TURNER replied that when the child attempted to bite the actual fact was that it always bit further forward. One of the best ways of beginning to combat post-normal occlusion was to get the molars to rise. That he knew from experience.

THE PRESIDENT thought the point which Mr. Turner wished to make was that when the jaw, in the case of old people, came upwards beyond its normal occlusion, the condyle was in its most posterior position in the glenoid cavity and remained there; whereas when the jaws were opened by raising the back teeth the condyle probably came a little forward in the glenoid cavity.

MR. J. G. TURNER said it probably did, but he had no proof of any of the explanations.

THE PRESIDENT asked Mr. Turner if he did not think that would rather tend to emphasise his point that when the jaw came up it necessarily came forward, because it was travelling from a fixed point which was its most posterior position—a fixed position in the glenoid cavity at the back of that cavity.

MR. J. G. TURNER said he agreed.

MR. NORTHCROFT said he believed he could explain what actually did happen when the bite had been opened in cases of post-normal occlusion. In many instances, he would not say in all, the tendency for the lower jaw to remain in post-normal occlusion was due to the extreme overbite and the locking by the front upper teeth. When that bite of convenience, if he might so express it, had been released, then the lower jaw sprang forward quite normally. One would see the same thing happening in Angle's Class 2, Division 2, where the parrot-shaped upper incisors were obtained. If the maxillary incisors were moved forward the mandible would shoot normally forward and accommodate itself in a normal bite. He imagined that was the true explanation of the mandible coming forward when the bite had been opened.

MR. MORRIS said immediately the discussion on Mr. Rushton's communication started, two cases came to his mind in which, instead of the molars coming forward, as they appeared to have done in Mr. Rushton's case, they went backwards; that was, the post-normal condition of the teeth was distinctly worse after the lower front teeth were depressed by having a bite plate in. On the other hand, he was very glad to hear Mr. Northcroft mention the Class 2, Division 2 case, because he had a similar case in which, when he pulled the incisors forward and put in

a bite plate, the jaw travelled forward. So that apparently there was some mechanical force at work which had not yet been discovered.

MR. SPILLER said he thought the explanation with regard to Mr. Morris's cases was the same in both instances. By some factor of the occlusion the jaw was held in a false position in each case, in the first two by the articulaton of the back teeth, and in the other by the retruding incisors. When this factor was removed the jaw was free to travel to its normal position, which it did, the normal in the first instance being a position of retrusion.

THE PRESIDENT said the discussion so far had shown how many points a comparatively simple case would give rise to, but it had drfted away from that which Mr. Rushton wished to bring before the meeting, namely, the result which he had achieved as the outcome of the loss of four pre-molars, and he would be glad if the members would take up that part of the discussion.

MR. MAXWELL STEPHENS said he would like to ask if there was any hollowing out in the profile.

MR. PREEDY said he would like to know what means of retraction Mr. Rushton had used—whether he had used piano wire or gold wire, or elastic bands.

MR. RUSHTON said the appliance he had used was, in the lower jaw, a vulcanite plate with Jackson cribs over the six-year molar and little points of gold in between the other teeth in order to get a purchase on the back teeth so as to pull back the front ones. As the members knew there was a very remarkable difference in the upper and lower jaw. In the upper, one had the assistance of the pressure of the hard palate; in the lower jaw, one did not receive that assistance, and therefore if one adopted this method the larger back teeth had to be entirely depended upon to pull back the smaller and less firmly fixed front teeth. He thought that remark answered one of Mr. J. G. Turner's questions. As was well-known action and reaction were equal and opposite, and he had no doubt that the appliance tended to a certain extent to pull forward the back teeth. It was not the jaw which moved, but it was the teeth in the jaw.

In answer to Mr. Preedy, he (Mr. Rushton) did not care for piano wire or elastic; he always used gold springs. One did not get such a powerful elastic spring with them, but they were cleaner and nicer in every way.

In the upper jaw the appliance was on similar lines, but of course in the upper jaw he obtained the assistance of the resistance of the hard palate; and he had not needed to be so careful in getting a purchase on the back teeth.

MR. CHAPMAN wished to know if Mr. Rushton's plate was of such a nature as to prevent the molars meeting—whether it was in effect a bite plate.

MR. RUSHTON said he thought to a certain extent it was. One knew in actual practice in the case of a child that after a little time the plate did not fit like it used to owing to the movement of the teeth. The tendency of the plate was to slightly rise. He thought in all probability one or both of the plates did act as a bite plate to raise the bite; although he might say the child took the plates out at mealtimes.

Dealing with the other points which had been raised, he desired again to throw the first slide on the screen, as Mr. Turner had objected to his saying the original bite was not a normal one.

MR. TURNER said he called it a normal molar bite.

MR. RUSHTON asked Mr. Turner if he would also call it a normal bicuspid bite, or a normal canine bite?

MR. TURNER replied that the molar bite shewn was a normal bite. The anterior part of the maxilla was of subnormal size, probably as a result of adenoids, and hence the crowding and mal-occlusion of the bicuspids and canines.

MR. RUSHTON said if Mr. Turner took it to be a normal molar bite, he begged to differ. The difference between that and the other bite in the finished case could readily be seen. The latter was normal and the former was not. He had already replied to Mr. Turner's query about the lower jaw. He (Mr. Rushton) did not think the lower jaw had moved at all; he thought the molar teeth had moved forward in the lower jaw. He certainly could not follow Mr. Turner when he said that where the bite was raised in a case such as he was showing, or where bite was reduced as in the case of edentulous people, a forward movement of the mandible was obtained in either case. Although he had no data to go upon, it was very difficult for him to believe that. Mr. Maxwell Stephens had enquired if he had noticed any hollowing of the profile. He thought that was a bugbear which had often been brought forward, but which he (Mr. Rushton) thought might very safely be laid to rest. He did not believe that in a case of the sort under discussion, or in many other cases, where the general facial contour was correct to start with, that the extraction of the premolar on either side would make the slightest difference with regard to any hollowing out of the cheeks. He thought in those cases where one saw the hollow cheeks and the undeveloped bones they were as a rule cases in which there had been mouth-breathing in early childhood.

MR. TURNER then exhibited models (Figs. 2 & 3) of the jaws of a child who had worn a tracheotomy tube for ten years. He said the patient was a boy about twelve years of age who, since the age of two, had worn a tracheotomy tube. At the age of between two and three the boy was operated on for adenoids. The jaws were well formed except that in the anterior part there was no room to accommodate the canines. The child's face was well developed. His nose was also well developed, and since the tracheotomy wound had been closed the boy had breathed freely through the nose. He had suffered in nowise from the disuse of his nose during ten years of childhood except that perhaps it might be said that the slight crowding of the canine was in some way due to disuse. He thought, however, that was to be traced to the effect of early adenoids, making the case more interesting because it showed that perhaps adenoids, in the absence of all compression due to mouth breathing, were still responsible for or concomitant with a sub-normal growth of the maxilla. In all other respects the child was well developed.

It would be noticed that the lower was crowded as well as the upper; he thought that was the result of the containing arch of the upper teeth. Incidentally the failure of the tongue to effect its "normal" purpose of enlarging the arches could be seen. There was the possibility of early extraction in the lower, but he could not obtain the history.

THE PRESIDENT said the members were much indebted to Mr. Turner for having brought forward the case, because there were not a great many of them obtainable. It was most important, if possible, that the Society should obtain as many models of such cases as it could; in fact, such specimens would be of great use to the Museum. He was not sure that the members had in their minds any cases where tracheotomy tubes had been worn for a period of ten years, say, from two to twelve, and he thought most of them must have been struck with the apparently small amount of contraction and mal-occlusion which had ensued as the result of non-nasal breathing. Of course, there was the fact that the child had had adenoids, and Mr. Turner had brought forward the very important point of the possible effect of adenoids upon

the dental arch, quite apart from any nasal stenosis which might be produced by the presence of adenoids.

MR. NORTHCROFT enquired if Mr. Turner was of the opinion that the removal of the adenoids in that particular case had the slightest effect. It seemed to him, without considering the matter very deeply, that it could not have had any effect. If the great reason for removing the adenoids was establishment of nasal breathing and so bringing about a normal development, then if the adenoids were removed, but nasal breathing was not established, the development of the jaw could not be affected by the operation. He thought Mr. Turner's case was a remarkably interesting one in that there was the history of the presence of adenoids and at the same time the wearing of the tracheotomy tube. Could Mr. Turner say if the sense of smell was established in tracheotomy cases after the adenoids had been removed and the tube put in, or was it destroyed? Did the sense of smell always accompany inhalation?

MR. TURNER said he would enquire into that matter.

DR. SIM WALLACE thought Mr. Turner's case a most interesting and fascinating one. No doubt all the members knew about the classical experiments in which the nostril of the calf on one side was blocked and that side developed quite as well as the functional side. He thought that although Mr. Turner's case had patent nostrils all the time yet he did not breathe through his nose. The point of special interest to him in regard to the case was that notwithstanding the lack of function of the nose the mouth was kept shut. That being so the tongue would have the power of doing what it could not do in ordinary cases of mouth breathing. Consequently one did not get what one generally obtained in cases of mouth-breathing, simply because the mouth was kept shut and the normal effect of the tongue was not interfered with. He might say in passing that he had been delighted to hear Mr. Turner's remark which indicated that he believed in that case, as in other cases, the effect of the tongue was to contribute to the normal development of the arch.

MR. W. RUSHTON thought Mr. Turner's model was one of the most interesting which the Society had had put before it since its inception. In a pair of models which he had the pleasure of seeing a short time ago from a somewhat similar case, the jaws seemed even better developed than in Mr. Turner's case; in neither case was the child a mouth-breather, and there was no sign in the models of a typical mouth-breathing jaw, and that was the main point. To his mind it seemed to show that although Mr. Turner said the tongue did not do its duty, in the present case and in the other case which some of the members had seen, the tongue did do its duty. The main duty of the tongue with regard to expanding the jaw was to remain for the greater part of the twenty-four hours in apposition with the palate; and in a case of the sort under discussion there was nothing to prevent the tongue from doing that. He should have been very much surprised if, under the circumstances, the jaw had not been fairly well developed. He would like to ask Mr. Turner if he thought that apart from any obstruction to nasal breathing caused by adenoids, adenoids interfered with the circulation of the lymphatic system in the development of the palate, like they were supposed to do with regard to the nourishment of the cerebral structures. He would also like to ask Mr. Turner if he was quite certain that the child did not partially use its nose. It seemed to him (Mr. Rushton) probable that its nose being perfectly patent it would naturally when asleep supplement the draught of air from the tracheotomy tube by using its nostrils.

MR. GEORGE THOMSON said Mr. Turner had not advanced to the members any theory about his case, neither had he given the history.

Without such information, and seeing the model for the first time, he (Mr. Thomson) jumped to the conclusion that it was a case of good inheritance plus breast feeding. He knew it was commonly held by many people that breast feeding had such a tremendous influence on the development of the jaw; and he thought that feeling arose from the fact that a great many children were brought up artificially and yet were well developed. He had heard the previous night a lecture by Prof. Karl Pearson in which that gentleman showed that many children who were brought up artificially were brought up by mothers of bad habits. Many also were brought up by mothers of good habits. Again, many children, if breast fed, were breast fed by mothers of bad habits, and, to cut the story short, the difference depended not so much on whether the child was breast fed or artificially fed as on the habits of the parents. Still, that did not at all upset the supposition that breast feeding was the correct method of bringing up a child, and if the child had good inheritance and was breast fed it might, in spite of being fed through a tracheotomy tube for such a long period as Mr. Turner's case was, still maintain the quality which it had inherited and derived from its mother's milk.

MR. H. CHAPMAN said he had been waiting for someone to emphasise the fact that Mr. Turner's child was not a mouth breather. The typical mouth breathing jaw was at once recognised, because the patient was unable to breathe through the nose, and apparently many had jumped to the conclusion that because the case was not one of normal nasal breathing it must be one of mouth breathing or must show the effects of mouth breathing. He had rather expected Mr. Rushton to have brought out that point following up his remarks with regard to the effect of the tongue on the upper jaw. Mr. Rushton might have said that the effect of the tongue on the upper jaw could still be brought into play in Mr. Turner's case, because the child was not a mouth breather, whereas if it had been, that could not have taken place.

MR. RUSHTON said that both Dr. Sim Wallace and himself had emphasised that fact.

MR. J. G. TURNER, in reply, said he quite agreed with Mr. Thomson that the point of whether the case had a good family history of healthy and careful parents, and a history of breast feeding or any other method of feeding, was of the utmost importance. He was sure it made a considerable difference to the child in what it had to combat afterwards. An early bad start was like giving a dog a bad name,—one might as well do away with the child. As far as Prof. Karl Pearson's lecture was concerned, he (Mr. Turner) had enquired into a great many cases of breast-fed and bottle-fed children, and he found it was the habit of the parents which particularly mattered. Where the parents had cleaned the bottles he found that teething troubles were almost as absent as in breast fed children. That indicated that those children were being fairly healthily nourished, at least, and the others were being poisoned from the earliest stage of life by being fed from dirty bottles.

He could not see that the fact of the child, or any other child, keeping its mouth shut and having its tongue in it, was any proof that the tongue did anything. It was well-known that the whole face grew together, and to allow that the tongue was the controlling factor appeared to him to be going beyond all reason.

At any rate here (indicating on the model) was a slight contraction in the upper jaw, and the tongue ought to have prevented it. Mr. Northcroft had enquired if he thought that could have been caused by adenoids at such an early age. As three years of growth had been lost it was possible that that might account for the small amount of contraction in the anterior maxillary portion. Then he had been asked by Mr.

Rushton if he thought that apart from obstruction there was interference of circulation of the lymphatic system. He thought it was possible. He knew that a considerable number of laryngologists did not think so, and they pointed to the cases of atrophic rhinitis, in which for a considerable time preceding the atrophic condition a very severe mucopurulent catarrh existed, which, of course, would entail interference with the lymphatic and arterial circulations, and an absorption of toxins. The maxillary growth, however, was always good in those cases, so orthodontists were faced by very considerable difficulties in deciphering what came before them.

MR. TURNER also exhibited two jaws showing the post mortem results of early extraction of the lower sixes, one (Fig. 4) had teeth *in situ*, and the other showed the sockets only. They were not isolated cases. In going over a number of Egyptian skulls he had come across quite a number of them, and there were skulls in the College of Surgeons Museum showing exactly the same tilting. There was one point in which the discussion of the two mandibles did touch Mr. Stephens' paper, namely, that whereas the lowers only tilted, the uppers came forward; but the upper six only came forward if the upper E was taken out. If the upper D was taken out both E and 6 remained. The result of compression was, of course, felt. The E and the 6 and the rest of the teeth were in a smaller arch when the teeth were pushed backwards and inwards. The curious point was that the E and the 6 did not come forward. If the first premolar was taken out, as far as he could make out, there was a possibility that the 5 and 6 came forward. That was a point well worth taking up. One could easily see that a compression into a smaller space masked the movements forwards or backwards.

Resumed Discussion on Mr. Maxwell Stephens' Paper.

MR. RUSHTON, in re-opening the discussion, said he desired to exhibit a few models showing what he thought might be useful points for the members to observe.

His first slide dealt with the loss of temporary canines. The slide showed a case in which the lower temporary canines were extracted, and it would be seen how the gap was almost filled up. The upper temporary canines were still *in situ*. It was an unfortunate thing that those had been extracted, because it made a contracted mandible still more contracted. The chief effect, he took it, of the extraction of temporary canines was when the permanent canine was not nearly at its period of eruption. In most of such cases if the permanent tooth was nearly erupted it was not so bad, but when the tooth was high up then crowding was obtained.

Slide 2 (Fig. 5) dealt with the premature loss of the first deciduous molars. He had a series of three models of the same child at different stages. The first, taken at the age of eight, showed the extraction of the first deciduous molars on both sides, and the second deciduous molar on the left. The result was that the temporary canine on the left had gone back two millimetres, and the first permanent molar had come forward two millimetres. The members would see by looking at the centre model the reason why the temporary canine had travelled back on the left more than the right. It was on account of the pressure of the permanent lateral which pushed the temporary canine backwards. On the right side the permanent lateral erupted entirely inside the arch, and so backward pressure was not obtained. The second model, taken at the age of nine, showed the erupted right lateral and first premolar. The left canine had receded still more—one millimetre—

and the first permanent molar had advanced one more millimetre. The third model, taken at the age of ten, showed the second left premolar crowded out. It had pushed the first premolar forward thus crowding up the canine space. The first permanent molar had not moved, as any further forward action had been checked by the erupting second premolar.

Mr. Rushton then proceeded to exhibit one or two models showing the loss of the second deciduous molars.

The first slide showed the space almost filled up. That, of course, was a very common experience.

The next two slides (Fig. 6, a & b) were two models of a child taken at different ages. The first showed the right upper deciduous molar and the second deciduous molar extracted. The second molar, showing the smaller space, was 20 months later. The space was filled up not so much by the advance of the molar as by the retraction of the first deciduous molar. He had measured them very carefully and it would be noticed, with regard to the bite, that the permanent molar had moved forward a little, but the deciduous first molar had moved backwards still more.

Mr. Stephens had stated in his paper that the premature loss of deciduous teeth resulted in the shortening of the dental arch. That was a very general statement, and required a certain amount of modification. He (Mr. Rushton) thought it depended on the tooth and depended on the person's age. He quite agreed with Mr. Stephens that the gradual movement of teeth on either side of the space towards each other was the result. He did not think there was any hard and fast rule with regard to the back teeth moving forward and the front teeth moving backward. He thought to a large extent it was a question of pressure. With regard to loss of development due to lack of stimulus, he thought that point was quite open to argument. He thought development was proved in those rare cases where no teeth had erupted and yet there were fairly well developed jaws.

Mr. J. G. Turner said he wished to deal first with Mr. Rushton's remarks. Mr. Rushton apparently thought that the movement of the temporary teeth was due to some pressure of the developed permanent teeth. He (Mr. Turner) would like to point out that exactly the same movement of teeth occurred when the succeeding permanent teeth were taken out at an early age. If a premolar was extracted, the teeth on either side shifted over to the vacant side and the teeth in front were pushed back. If it was in the upper, there was a tendency for the teeth behind to come forward. All that ceased when the growth was complete; that was to say, when there was no more movement of bone to be expected to carry the back teeth of the maxilla forward, and when the bones were set and the tooth-roots completed. Bone-growth was one factor in moving the teeth, the other was pressure of the lips and cheeks constantly tending to press them backwards and inwards, and active both on temporary and permanent teeth.

There was one point in Mr. Stephens' paper which he must query. Mr. Stephens said " First let me speak of a constitutional factor that leads to the premature loss of many deciduous teeth. I refer to hereditary syphilis." That was not his (Mr. Turner's) experience at all, and he would like the ground on which that statement was made. It was possible that some of the early cases of eruption were really exfoliation of necrosed teeth—dead because of the syphilitic infection. He would also like to know what " interstitial growth " meant, and he did not know the meaning of the " wedging action causing interstitial growth in the cases of temporary molars." In the paper there was an interesting account of the deciduous central incisor existing as a diffused abortion which was removed earlier. He would like to ask if that abortion had

been kept and was available for inspection, especially as it was followed by absence of its successor.

DR. SIM WALLACE also enquired what Mr. Stephens meant by "interstitial growth."

MR. RUSHTON, in reply to Mr. Turner, said that Mr. Turner had just stated that when bones were fully developed there was no further forward progress of a tooth possible. He would like to ask Mr. Turner how many times he had had to ease a case in a person of mature years in which a tooth had come further forward.

With regard to all the movements being due to the lips and cheeks, the case he (Mr. Rushton) had exhibited where the temporary canine had receded backwards on one side on account of the erupting lateral, and being perfectly stationary on the other side, because the erupting lateral had erupted right inside the arch where no such action took place, seemed to him proof positive.

MR. GEORGE THOMSON said that Mr. Maxwell Stephens stated in the course of his paper that "The upper incisor and the canine teeth play their part in maintaining the maximum development of the arch, chiefly by holding out beyond the lower teeth that portion of alveolus in which they are situated." He (Mr. Thomson) could not quite follow that, because he always had an idea that the best developed jaws were found where the lower incisors were not over, but edge to edge.

With regard to the term "hereditary syphilis" which had been used in the paper, he thought Mr. Stephens would have better expressed himself if he had substituted the word "congenital." Mr. Stephens had also said in his paper "So terrible and disorganised, however, are the effects of this scourge upon the dentition generally." He thought that rather suggested that the effect of syphilis on the teeth was much more common than it really was. As a matter of fact it was very rare.

MR. TURNER said his reply to Mr. Rushton's first query to him was in the negative. He found that sepsis was the factor that moved permanent teeth. With regard to the model, he quite disagreed with Mr. Rushton's explanation of it. The one lateral erupted in its developmental position as the result of compression of adenoids; the other lateral would have erupted in its developmental position but for the fact that the temporary canines had been pushed out of the way by lips and cheeks in a backward direction.

MR. SPILLER said the dispute as to whether the back teeth moved forwards or the front ones backwards could be settled, at any rate with regard to the upper jaw, by taking two fixed points of measurements on a model on the rugœ of the palate.

With regard to the paper, Mr. Stephens had said, speaking of septic teeth, "In my experience there is little hope for that tooth and out it must come sooner or later." He (Mr. Spiller) begged to differ from Mr. Stephens in that respect. If it was possible mechanically to fill that tooth in at least 90 per cent. of cases it could be easily retained, provided there was no glandular infection. It was merely a question of sterilising the tooth and filling the pulp chamber properly.

A method he had used for some years was as follows:—At the first visit the pulp chamber and root canals were well opened up and freely irrigated with peroxide of hydrogen, followed by absolute alcohol; they were then dried with hot air and dressed with tricresol and formalin, and in cases where an abscess or sinus existed a little paraform was added; this dressing was sealed in the tooth with artificial dentine and left some days. If there was an abscess or sinus present this was treated externally. At the second visit the pulp chamber was filled with a stiff paste made by mixing a powder consisting of zinc oxysulphate containing 10 per cent. of paraform with tricresol and formalin; a little

of this could be worked into the root canals. This could be used in the same way in permanent teeth, except that in this case the root canals should be completely filled. He had used this on a very similar method for about ten years with very few failures.

He exhibited several teeth which he had treated in this way two years ago, and which had been recently extracted. He brought them forward because formerly they were as septic as they could be, and one could now see that the processes of absorption had been very little retarded. In this instance the patient now had perfect arches, which she would not have had if the temporary teeth had been removed two years previously.

MR. MAXWELL STEPHENS, in reply, said with regard to Mr. Spiller's remarks, he (Mr. Stephens) did not think anyone would willingly sacrifice a temporary tooth, especially those who were fond of children; but there were extremes of treatment in which it was found that the tooth had decayed so much that it could not be controlled, and it was to such cases as those to which he alluded in his paper. He thought the method which Mr. Spiller had outlined was one which all orthodontists more or less adopted. It would be useful to have the exact composition of the mixture.

With regard to the question of syphilis, he took it the teeth were thrown off in the sequestra, and what he meant by saying the disease was a terrible scourge was that the teeth having been lost a general jumble up of the bite, occlusion and the attitude of the teeth, such as Mr. Rushton had exhibited, might take place afterwards.

With regard to the phrase "interstitial growth." Supposing one had a certain amount of air in a closed cavity, if the walls of that cavity were expanded, and they were dragged further back, he took it that the air would expand within it; and it had always struck him that if there was pressure pulling the outer space of the jaw apart, the bony trabeculæ would be pulled apart in their growth also and have a tendency to elongate.

With regard to the wedging action, he meant, while the temporary teeth were in position in the jaw, they certainly, in occupying their position, kept the space open and prevented the other teeth from closing in, whether they actually moved or whether they simply tilted.

Unfortunately he had only the word of the parent with regard to the case of the fused abortion. He should like to have obtained that tooth; it was probably the lateral which was missing.

THE PRESIDENT, having thanked those members who had brought forward communications, declared the meeting adjourned.

ORDINARY MEETING.

A meeting of the British Society for the Study of Orthodontics was held at 11, Chandos Street, Cavendish Square, W., on Wednesday evening, March 12th, 1913, Mr. MONTAGU F. HOPSON, President, in the chair.

The minutes of the meeting of the 12th February, 1913, were read and confirmed.

Messrs. C. Lees and H. D. Shore signed the Obligation Book and were admitted members of the Society.

CASUAL COMMUNICATIONS.

Models of Two Cases of Open Bite.

By Mr. J. H. BADCOCK.

Mr. Badcock exhibited two models of a case of open bite sent by his brother, Mr. Christopher Badcock, of Madras, who received the following characteristic letter (see illustration on opposite page).

To the Dental Surgeon, General Hospital.

Most Honoured Sir,—I, the guardian of the patient No. 621 Gopalan of your hospital, beg to bring the following few lines for your kind perusal.

The boy was subjected to an attack of mautham or convulsions (due to indigestion) in his second year, and he was suffering from that disease till his eighth year. During his sickness the boy was administered with a good quantity of native medicine which, in my humble opinion, has affected his health. The boy could not speak fluently and he did not at all speak till his fourth year. He is now reading in the primary school and he has got a very weak memory. I humbly beg to request that with the above possible information that I have given, you would kindly give him the possible treatment for which act of kindness and charity I should feel highly thankful.—I beg to remain, Most Honoured Sir, your most obedient and humble servant.

Mr. C. F. Badcock's notes were as follows :—

Hindu Patient, *æt.* 17, male.

Defective intellect, idiotic expressions, models showing open bite, a bit sucked, but the incisors were thin and defective.

C. F. BADCOCK, March, 1908.

The lack of growth in the anterior part of each jaw was very evident. It was one of the worst cases he had ever seen, and fortunately it was not necessary to treat it.

He exhibited the second case merely with the idea of asking members for information. It would be seen from the model that there was an open bite in the bicuspid region on both sides. He proposed to pull down the upper and to pull up the lower until the teeth were in contact, and he would like information from the members as to the results of

Mr. J. H. Badcock's Communication.

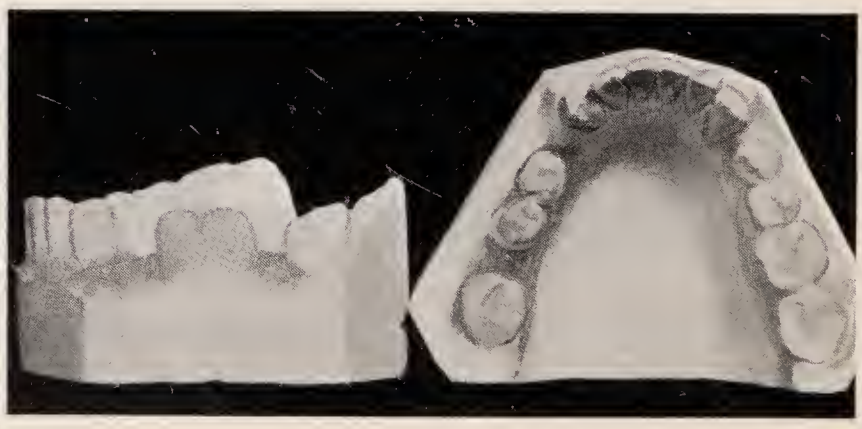
Mr. J. E. Spiller's Communication.

Slide I

Slide II.

Slide III.

Slide IV.



such cases. Could any of the members who had drawn teeth into occlusion which refused to meet as much as those shown in the model did, say whether they remained in occlusion for some time afterwards. He had dealt with very few such cases and had no experience of the ultimate result, except one case which he believed was very good. The retention, however, was not kept on long enough, and the whole thing reverted, although it did not get quite as bad as it was before. The patient was just cutting her second molars.

The PRESIDENT did not think any member would care to undertake the first case in an orthodontic manner. It was a most extraordinary case of open bite, and had more the appearance of a fish than anything else. The only thing to do would be to remove the teeth and substitute gum sections in front.

With regard to the second case, he had had experience of elongating central incisor teeth generally which had been slightly chipped, pulling them down, trimming up the edge and holding them in place for some considerable time, and they had done fairly well; and he had also had an accidental experience of pushing a premolar upwards. Some years ago he had to put in a denture just before the holidays, and he allowed a clasp around a premolar to move during the flasking of the case, with the result that it was too low upon the tooth. As a result the spring and the pressure of the clasp drove the premolar up at the side. It subsequently came down again by itself, and he believed that was a fairly general experience with teeth which had been driven upwards accidentally. It was seen in cases where a tooth had been driven upwards and not fractured as the result of a blow.

Mr. MORRIS mentioned a case he had about ten years ago in which he lifted the first bicuspid on each side of the lower jaw, and to a certain extent the second, which was held in that position for about nine or ten months, had a flexible arch running round from D-bands on the first molars underneath spurs on the first and second bicuspids and over the top of spurs on a band to the central and lateral incisors. They were raised by threading the thin arch into place, letting it slip underneath the hooks on the first and second bicuspids, and raising it up and putting it over the laterals and incisors. They remained there quite well. His brother had a case in which he raised them by having springs put on a vulcanite plate worn on the inside. That child's teeth apparently were in position and had been held in position for quite nine months. The cases were very rare. In regard to the President's point, he had had a similar experience in rotating a second bicuspid from a hook on the back of a canine. By some extraordinary accident the elastic got over the inside of the first bicuspid, which was slightly standing in, and forced it down to the level of the gum. When he took the elastic band off it came up again by itself. He saw no reason at all why a tooth that had been elongated and held there for some months should not return to its position. If the patient was a good age it would make a considerable difference. He had in his mind to take some skiagrams of teeth in their new positions to see how long it took for bone to form in the space that was left when the tooth had been removed.

The PRESIDENT said there was an interesting point as to why those teeth failed to come into occlusion. They were apparently not impacted. There was also another question with regard to what happened to the vessels in the apical region when a tooth was brought directly upwards like that.

Mr. RUSHTON said he was doubtful whether it was worth while from the patient's point of view to undertake such a case at all. Was it Mr. Badcock's intention to improve the appearance or the mastication

of the patient, or to perform an operation with those points in view? Personally he should have thought the game was not worth the candle. He had had one or two cases of the kind which he had remedied to a certain extent by grinding down the cusps. In the case under discussion, he did not know whether it was possible to grind down the cusps of the molars and the lower incisors and so improve the bite. It was a question whether it was justifiable to condemn a child to wear an appliance for a long space of time for a doubtful benefit.

Mr. HAROLD CHAPMAN said that it did not seem necessary to treat such a case with very complicated apparatus. If it was thought advisable to reduce the trouble to a minimum, one side might be treated first for the purpose of seeing what happened. All that was necessary was to put on a plain band with a spur directed to the gum margin for each of the teeth to be elongated and a rubber band joining the two.

Mr. J. H. BADCOCK said he was anxious to get evidence of what had been done in the matter, and Mr. Morris had kindly supplied some. Encouraged by that, he would go on with a case which he had already begun, in spite of what Mr. Rushton said. The main reason he undertook it was to improve the bite which was very inefficient. It was really worse in the mouth than the model showed. Looked at from the outside as seen on the screen there was not very much the matter, though it was obvious there was not much efficiency of mastication in the bicuspid region. But looked at on the inside, the condition was decidedly worse and the child did not get anything like the masticating power she ought to. Mr. Chapman's thoughts and his own were on similar lines. Had it meant a very long and elaborate treatment he probably might have thought with Mr. Rushton that it was not worth while, but it seemed to him a fairly simple matter to raise the teeth into occlusion, and his only doubt was whether or not they would remain there. It was very interesting to speculate as to the causes of the non-eruption of teeth in such cases. He had a case only two or three days ago of a man whose teeth in the bicuspid region had not come into occlusion by a matter of 2 or 3 mm. for no cause that he could discover. He presumed it was analogous to the causes which prevented the Hindoo's teeth occluding.

The PRESIDENT remarked that in the previous week he saw a man aged 45 who had all his teeth standing, but his first lower molar on the right side was late in erupting, was practically impacted, and had never come up into occlusion.

Mr. J. E. SPILLER showed the following two cases :—

(a) A Case Showing Expansion of the Upper Arch without Treatment.

(b) A Case Showing Movement of Lower Premolars without Tilting.

The first models (slide I.) are those of the jaws of a boy aged 7½ years, whom I first saw in October, 1904. At that time the case interested me because of the open bite in the temporary molar region on both sides. I do not think this condition is usual and can explain it only by the suggestion that the occlusion was probably post-normal at some time previously (it would appear so from examination of the models only at this time also), and that natural forces were working to correct it by the advancement of the mandible. I was asked to treat the "crowded" condition of the teeth, and decided on the immediate extraction of a

lower incisor followed by the removal of the two first upper premolars two or three years later. I selected the lower right central, but owing to a very bad anæsthesia I removed the right lateral instead.

The second models (slide II.) were taken a year later. It will be seen that the temporary molars are now in occlusion and that the occlusion of the six year molars is advancing toward the normal. The upper laterals are erupting and there is obviously insufficient room for them in the arch. The third models (slide III.) were taken at the age of 16. The occlusion is now normal and the arches have expanded sufficiently to allow all the teeth to come into good position. The overbite is slightly excessive in the incisor region but the gums are perfectly healthy (the models are not good). The teeth have been practically free from caries and the boy has always been a vigorous masticator of hard food.

The measurements in mms. of the arches are as follows :—

UPPER.

Width :	At $7\frac{1}{2}$ years.	At $8\frac{1}{2}$ years.	At 16 years.	Total increase.
Canine	35·8	36	38·3	2·5
1st temporary molar or premolar	42·7	43	45	2·3
1st permanent molar	55·4	55·6	58	2·6
Length	45	46·2	46·2	1·2

LOWER.

Width :				
Canine	31·5	30	28	3·5
1st temporary molar or premolar	38	38	37	1
1st permanent molar	53	53·5	54	1
Length	44	42·5	39·5	4·5

The width is measured between the external cervical margins of the teeth and the length from the posterior border of the first molars to the mesial angle of the central incisors.

I think the remarkable feature of this case is the growth of the upper arch, in spite of the early extraction of the lower incisor. Apart from this it raises the question if we do not too often adopt mechanical methods for the expansion of the arches, when this might probably be established by natural methods.

At our last meeting Mr. Turner brought forward specimens to show that after extraction of the lower first permanent molar subsequent movement of the second molar was never bodily translation, but merely a tilting forward of that tooth. I am not convinced of the invariable accuracy of that rule ; in this case (slide IV.) I believe the lower right second molar has moved bodily. I have brought this case, however, to show another movement that may take place, *viz.*, the translation backward of the bicuspids. The teeth are those of an adult man and the first molars were extracted between the ages of 10 to 12 years. The translation of the bicuspids is greater on the left side, but it is partially masked on the right side by the dropping back of the canine. It is very easy to understand the mechanism of tilting, but I should be glad to hear an explanation of the forces producing bodily translation of teeth.

Mr. J. H. BADCOCK understood that the amount of expansion that had been obtained was the measure of the difference between the temporary dentition and the permanent.

Mr. SPILLER replied that that was correct, but the width between the first permanent molars was also shown in each case.

Mr. BADCOCK said in that case it seemed to him doubtful whether any great expansion had taken place because the permanent teeth were bigger than the temporary teeth. They generally erupted a little to the outer side in the normal way. The expansion was, after all, small, and it seemed to him it was accounted for by the larger size of the permanent teeth compared with the temporary teeth.

Mr. BADCOCK thought that a certain amount of apparent expansion was obtained owing to the fact that the permanent teeth were bigger than the temporary teeth that they succeeded, but he did not think that as a general rule any more than very slight expansion was obtained after the teeth once came into position. It seemed to him that the growth of the jaw took place almost entirely backwards and very little laterally in the ordinary way.

The PRESIDENT thought Mr. Badcock would be interested to notice that originally the bite was post-normal, and now it had become practically normal. The models showed that it had been a very distinct gain.

Mr. SPILLER said he brought the case forward because it was a common type which practitioners were always inclined to treat by expansion plates and the present result showed that might not always be necessary.

Mr. MORRIS said he was very interested to hear that the case which seemed to promise a considerable amount of irregularity in the incisor region had corrected itself, because he had a case almost identical with it seventeen months ago in which the parents were very much against his doing any expansion. He very reluctantly consented to remove the right lower central, and pushed out the two in-standing laterals, which were much worse in-standing than those shown by the author. He was encouraged to hope that the future would confirm his expectations after seeing Mr. Spiller's results, because at present the patient was crowded in the canine region ; the canines were beginning to come through rather prominently, but he hoped his tongue or some other factor would enlarge his jaw for him.

Mr. RUSHTON asked whether any appliance was worn in the mandible.

Mr. SPILLER replied in the negative.

Mr. RUSHTON thought that to a large extent the success of the case was due to the fact of the child not being a mouth-breather, but a nose-breather. He had found in those cases that where a tooth was extracted in the lower if the child was a mouth-breather a plate must be worn for a considerable time to do away with any probable repetition of overcrowding in the lower incisor region. It only showed what could be done by waiting for Nature and not being in too great a hurry to use an expansion plate in every case.

Mr. MORRIS asked Mr. Spiller whether he had any theory as to why the upper centrals had moved forward in the obvious way they had.

Mr. RUSHTON said the case evidently presented the same phenomenon as the somewhat similar case he brought forward at the last meeting, namely, that owing to the extraction of the lower teeth they assumed a normal condition.

Mr. J. E. SPILLER, in reply, said Mr. Badcock had suggested that the expansion was more apparent than real. It certainly was in front of the mouth, because it was taken from the temporary canines in the first place, and the permanent in the second. At the same time there was a very slight expansion in the region of the first permanent molars in the third models. He thought the expansion of 2·6 mm. in the upper and in the lower, although not considerable, was a definite expansion and well marked. He suggested that Mr. Morris should put

his patient on a solid diet. His own patient was the most vigorous masticator he had known. He could not say why the upper central had moved forward. Mr. Rushton stated that the lower teeth assumed normal occlusion following extraction of the lower incisor. The case certainly seemed to illustrate Mr. Rushton's proposition, but he was far from believing it was correct in all cases. He would not care to extract a lower tooth hoping that the bite would come forward in any case. It seemed to him the bite would be less likely to come forward.

Mr. RUSHTON said he simply brought it forward as a remarkable fact, not as a method of treatment.

The PRESIDENT said, with regard to Mr. Spiller's second case, he did not recall a case in which he had seen both premolars travel backwards, but he thought it was a fairly common experience to find the second premolar travel backwards and come always in contact or entirely in contact with the second permanent molar, leaving a wide interval between the two premolars. He had seen a large number of those cases. In his presidential address he made a point of that as one of the problems which still had to be solved, as to why teeth did decidedly travel in that particular manner.

The following paper was then read by Mr. J. E. SPILLER :—

How Early can Post-Normal Occlusion be Detected? Is it Preventable and Curable? What is the Best Age to begin Treatment?

At the urgent request of your secretary, I venture to bring forward some questions connected with post-normal occlusion, for discussion to-night. I think it will be conceded that in the whole field of orthodontics there are few subjects more interesting than post-normal occlusion, and probably none on which more widely divergent views are held.

You are well aware that various classifications of irregularities have been formulated for orthodontic use, some of which deal with the occlusion of the teeth only. The most widely known of these is Angle's classification, which, using the terminology to which we are accustomed, is briefly as follows :—

Class I. Normal occlusion.
Class II. Post-normal occlusion.
Class III. Pre-normal occlusion.

Without wishing to detract from the value of the Angle classification, I suggest (and it has often been suggested before) that a classification of occlusion only is not sufficient in orthodontics, and so, for the purposes of this paper, if for no other, I have ventured to amplify it in a way by an understood co-relation with the face and cranium and by this we very simply and logically get seven classes. These are

1. Normal occlusion.
2. Inferior post-normal occlusion.
3. Inferior pre-normal occlusion.
4. Superior post-normal occlusion.
5. Superior pre-normal occlusion.
6. Double retrusion.
7. Double protrusion.

At the outset I think it necessary clearly to recognise that there are different kinds of what is commonly known as post-normal occlusion ; clinically, I recognise four distinct types, *viz.* :—

(a) Inferior retrusion, or sub-normality, usually associated with the upper incisors in proclination, a narrow maxillary arch and nasal obstruction (Angle, Class II., Div. I.).

(b) Relative post-normal occlusion of the lower arch associated with the upper incisor teeth in retroinclination and usually no nasal obstruction (Angle, Class II., Div. II.).

(c) Superior protrusion of the upper arch and teeth (in relation to the face and cranium).

(d) Pre-normal occlusion of the upper molars, frequently associated with mal-alignment of the canines or premolars. This condition is purely the result of the forward migration of the first upper permanent molars.

Let me state at once that I consider (c) and (d) are in no way examples of true post-normal occlusion, and I propose to consider only types (a) and (b) in detail with reference to the questions under discussion.

The first point, " How early can post-normal occlusion be recognised ? " at once raises the question of causation. I am aware that different views are held on this subject—may I mention some of them ?

Mr. J. H. Badcock has recently stated that he considers the condition inherited, or at any rate prenatal in origin.

Dr. Sim Wallace has advanced a theory that the occlusion is formed by the gnawing habit, which exists in all children at the age when the temporary incisor teeth have just erupted, or are erupting. If provision be not made for the accomplishment of this habit the mandible may not be advanced to its proper position and a condition of post-normality occurs. Conversely if the gnawing habit take place, as it normally should do, the correct occlusion is formed. This would seem to connote that the mandible is in a position of retrusion in all infants at birth—it certainly does appear so—and I would suggest that this is a promising subject for further investigation.

Mr. Geo. Northcroft has suggested that the order of eruption of the temporary teeth may determine the occlusion. Thus, if the upper incisors erupt before the lower ones, they may be forced by lip pressure into a position of retro-inclination and so hold back the lower incisor teeth and the mandible.

Another proposition is that the lower jaw is deficient in antero-posterior growth, and so the lower arch is not carried forward to its correct position.

Prominent among other theories is that which includes the rôle of adenoids as a factor of causation, and in this connection I would like to consider types a and b (Angle, Class II., Divs. I. and II.) separately.

In type (a) there is a history of nasal obstruction in at least 90 per cent. of cases, and I suggest that the age of incidence of adenoids is a determining factor in occlusion. Let us suppose that this obstruction occurs in the first eighteen months of life : I think it is admitted that a narrowed arch is the inevitable result, as a

consequence the distance (measured across the palate) between the upper canines is less than it should be, the result of which is that the lower canines are unable to occlude normally, and so, little by little, the mandible takes a position of convenience and becomes post-normal, or in rare cases pre-normal.

If the obstruction occur after the eruption of all the temporary teeth it could not affect the occlusion, and I think this may be a simple explanation of the occurrence of normal occlusion associated with adenoids. Should the adenoids be removed very early and nasal breathing be re-established, correct occlusion may yet result without mechanical interference. I know cases of two children of the same parents who both had adenoids in early life ; the one child had them removed in her second year and has normal occlusion; the other had them removed later and has a well-marked post-normal occlusion.

I do not deny the possible influence of genetic factors in some cases of this type. We occasionally see cases which have most of the clinical characteristics with the exception of nasal obstruction, or any history of it. Acknowledging that such history is frequently in complete obscurity, there are cases in which such obstruction never occurred, and it is just these cases that might rationally be explained by genetic influences.

Now let us consider cases of type b (Angle, Class II., Div. II.). Here at once we are confronted with conditions which present entirely different clinical characteristics ; not only is there a retro-inclination of upper incisor teeth, but nasal obstruction is absent in the great majority of cases, and little, if any, narrowing of the maxillary arch occurs, except such as may be explained as the result of occlusional force. But what is equally important is the position of the mandible. I am far from convinced that this is in a position of retrusion and I particularly invite definite opinions on this point. Judging from the photographs of finished cases published in the latest edition of Angle's "Mal-occlusion" and elsewhere, I believe that the mandible is not retruded and was not so originally, since the lower teeth have only been advanced a fractional amount, and yet the facial harmony is perfect.

If this be true we are probably wrong in describing these cases as examples of true post-normal occlusion. I believe the majority of them would be better described as pseudo post-normal or as superior pre-normal occlusion. In any case the causation is quite obscure to me, and we must, I think, accept the genetic theory as the least improbable.

I apologize for this long discussion of a side issue ; the question is " How early can post-normal occlusion be detected ? " I answer that we can diagnose it with certainty when the deciduous dentition is complete, and in those cases where there is marked retro-inclination of the upper incisor teeth we can diagnose it as early as those teeth have erupted.

The second question asked is " Is post-normal occlusion preventible ? " As I have already suggested, my personal view is that this condition may be either acquired or congenital. In the acquired cases I am of opinion that the condition might have been prevented or greatly modified by the early establishment and

maintenance of normal breathing and masticating habits. The only direct evidence I can give in favour of this is that already cited, but I trust that if any member has the opportunity of testing this theory on twin children with adenoids, he will not hesitate to do so in the interests of orthodontics.

In congenital or inherited cases I know of no means whereby we can prevent the occurrence of post-normal occlusion, but I trust to hear the opinions of members who are interested in the study of eugenics.

The last questions are " Is post-normal occlusion curable, and what is the best age to begin treatment ? " The answers to these questions are outside the range of mere speculation and can probably be supplied from the practical experience of every one of us. What are the methods of treatment ? I take it these are three in number, *viz.* :—

(a) Jumping the bite.

(b) Retraction or tipping back of the upper teeth, commencing with the six-year molar, combined with some reciprocal forward movement of the lower arch.

(c) Extraction of an upper tooth on each side and retraction or alignment of the front teeth as necessary.

At the present time there seems to be great difference of opinion as to whether a bite should be jumped, and the greatest doubt is expressed as to the possibility of the permanent advancement of the mandible. My personal experience is that I have had many cases where this advancement has not been permanent, but I have had some few cases where, after the lapse of several years, I believe there has been definite improvement in its position. We are told that such is an anatomical impossibility, and yet I believe I have heard several members state that in certain cases they have merely expanded or elongated the upper arch and the bite jumped itself without further mechanical aid.

As a treatment I believe the chances of ultimate success are small, although for æsthetic reasons it promises the best result where there is very marked retrusion of the mandible.

I do not know the best age to begin treatment ; if a spontaneous cure is anticipated by simple treatment of the upper arch I believe the earlier this is done the better the chance of success. I have one such case where I began treatment at the age of $3\frac{1}{2}$ years, which at present promises well. If reciprocal traction is used the choice of age must depend greatly on circumstances, but I should defer the attempt until the age of eight years, except that a biting plate should be worn for a year previously, if necessary.

By these methods I believe that post-normal occlusion is curable in the true sense of the word, in those rare cases where the treatment is successful.

In the second method, by retraction of the upper teeth, commencing with the tipping back of the six-year molars, I believe the best age to begin is again about eight years ; the disadvantage of the early start is the fact that treatment is spread over several years as intermediate retention of the upper molars is necessary. If it is established that the mandible is retruded I do not believe that post-normal occlusion is curable in these cases, in the true sense

of the word, as, granting that there is a reciprocal forward movement of the lower teeth, the result must be a partial double retrusion. This may be not undesirable, but that is outside the question. But if the mandible, as I believe is frequently the case, is not retruded, then the post-normal occlusion is definitely curable by this method of treatment.

The third method is by the symmetrical extraction of an upper premolar tooth, usually the first. I believe the best age to do this is a little before its eruption, the date of which varies considerably. If a close bite requires treatment this should be started at least a year previously. A complication in this method may arise through the eruption of the canine teeth in bad position, so I think their position should be clearly determined before extraction of the premolars is decided upon. Again assuming that the mandible is retruded, I believe that post-normal occlusion is in no way curable by this method, although according to the common significance of the phrase it would be partly so, as the anterior teeth are in normal occlusion when the treatment is complete.

Gentlemen, may I remind you that these remarks are intended only as an introduction of a discussion, and I trust you will not hesitate to express your views as freely as I have expressed mine.

Discussion.

Mr. HEDLEY C. VISICK, in opening the discussion, said the paper certainly brought up many interesting points and dealt with a subject, or rather subjects, which caused all the members a considerable amount of thought and possibly worry from time to time. The author mentioned an "understood co-relation between the teeth and the face and cranium." That understood relationship was all very well in theory, but he would like to hear a little more on the subject. On what did the author base that co-relationship? Was each man to have his own ideas on the subject or was he to have a definite plan on which to work? What means had they of measuring that relationship? Were they to take the relationship of the teeth to the cranium or of the lips to the face? If those of the lips were taken they might be no guide to the teeth. He thought the author's amplification of Angle's definition of post-normal occlusion was very good in theory, but there again what definite facts had the members to go on? Certainly they had Dr. Sim Wallace's prosopometer which would give a measurement showing the relationship of the teeth to the cranium; but a definite measurement was required which would enable one to say that in such and such a case the upper first molar was pre-normal to the extent of, say, 2 mm. Really the crux of the matter was, what was normal? In practice one felt the need of classes (c) and (d) set out by the author, but it was necessary first to ascertain the normal. Mr. Spiller, on page 2, stated in connection with the influence of nasal obstruction on the occlusion, "if the obstruction occurs after the eruption of all the temporary teeth it could not affect the occlusion, and I think this may be a simple explanation of the occurrence of normal occlusion associated with adenoids." It seemed to him that if obstruction occurred after the temporary teeth were all erupted it might still affect the permanent dentition by not allowing the expansion of the arch prior to the eruption of the permanent teeth, a lack of which expansion at the age of five years constituted a deformity (Dr. E. A.

Bogue). He thought the influence of the adenoids would still come into play. He considered Mr. Northcroft's suggestion on page 2 was a very good solution of many of the cases, where the upper incisors erupted before the lower, and the author's explanation on the same page was a very ingenious solution indeed. The next point for consideration was Mr. Spiller's type (b), (Angle's Class II., Division 2). The author there raised a very interesting point and one which was likely to cause a considerable amount of comment. He could not say that he agreed that those cases might be classed as causes of "Superior pre-normal occlusion," as in the cases of that type which he had seen the lower jaw or rather the chin had appeared very weak when taken into account with the general harmony of the features. He was afraid his experience would not permit his making any definite suggestion as to the true state of affairs. "How early could post-normal occlusion be detected?" was a question which he considered it was impossible to answer, unless one had had considerable experience with very small children and had been able to watch their teeth closely for a number of years. When all the temporary teeth had erupted it was an easy matter to determine whether the temporary molars were in correct relationship to each other, but he scarcely thought it possible definitely to state before the eruption of the temporary molars whether the jaws were in correct relationship. In those cases where there was retro-inclination of the temporary incisors it might look as if a case of post-normal occlusion would result, but it was sometimes found that the incisors might be abnormally flattened in appearance and yet the temporary molars might be in normal occlusion. Was post-normal occlusion curable? It depended on so many conditions that a definite answer could not be given. Each case had to be considered on its merits, and he thought no one would dispute the fact from what had been seen from time to time of cases brought before this and other societies, that certain cases of post-normal occlusion were undoubtedly curable. Speaking from personal experience, he was rather despondent about the possibility of permanent benefit derived from treatment, in many cases, taking into consideration the circumstances under which they worked. What was the best age at which to commence treatment? The earlier the better. If it was desired to get permanent results it was necessary to train the tree in the way in which it should grow. Their chances of successful treatment were much greater when they were dealing with growing bone than when they were dealing with bone already formed and hardened. Of course, a stage arrived in which it was almost impossible to treat the cases, such as when the temporary molars were lost early and the six-year molars were late in eruption. They were handicapped there by the fact that there was practically nothing on which to fix the appliances. In those cases he thought it better to wait to the age of eight, as suggested by Mr. Spiller, or even later, in order to allow the premolars time to erupt, otherwise the case would have to be retained for a much longer period. With regard to the last method mentioned by the author, namely, the extraction of the first upper premolars, he was beginning to feel more than ever that that treatment, if combined with intelligent after-treatment, was likely to be far more successful in a number of cases which came along for treatment, as in England we had not only to fight against the irregularity, but against the prejudices of the parents and school authorities, when it was a case of frequent visits. In these cases where one had to fight against such odds drastic measures were necessary to overcome the odds.

Mr. J. H. Badcock said he desired one point further elucidating, where the author said, "Let us suppose that this obstruction occurs in the first eighteen months of life; I think it is admitted that a

narrowed arch is the inevitable result." Did the author mean that the arch was made narrower than it originally was or that it did not expand ?

Mr. SPILLER said, it did not expand.

Mr. BADCOCK said that he had yet to see a case where that condition had been acquired. He did not deny that it might be acquired, but so far he had never seen a case where the evidence appeared to him sufficient to prove that it had been acquired. How early could post-normal occlusion be detected ? Some time ago he addressed questions to a number of medical men asking them to tell him what was the condition of the jaws at birth, and none of them could say because they had not noticed. Some of them thought that the mandible was protruded ; some of them thought it was retracted, but he could not get any definite information on the point. With regard to Angle's Divisions I. and II., he desired to put two slides on the screen. There were two very distinct types of (b) of Division II. One was that which was accompanied by a very deep overbite and another where the overbite was not necessarily very deep, and he thought they belonged to different causes.

He thought the author would probably agree with him that the models were fairly typical of Divisions I. and II., but they happened to be the same mouth. In the case on the right side the lip had got underneath the teeth and pushed them up. On the left side the central and the lateral were within the control of the upper lip and got pushed back with the result that the canine was crowded.

If the case were cut in two it was quite typical of those two divisions, and it seemed to him to prove that in a number of cases, at any rate, whether a case developed into a Division I. or Division II. depended more or less upon accidental circumstances, namely, whether the lower lip got behind the teeth or in front of them ; it depended a great deal on the length of the lip. Possibly in a number of cases it was merely the result of the more or less acceptable position of the lip in relation to the teeth, and it had nothing to do with deeper causes. It might be associated with adenoids and it might not, and he did not think there was any more reason why the one should be the case than the other, except that if the teeth happened to stick out it tended to make a child breathe through its mouth, though not always so. With regard to the method of treatment, the possibility of jumping the bite, by which he presumed the author meant the advancement of the mandible, the question had to be considered whether it remained advanced. It often did not. He remembered a case, which the author published in the Transactions, of a girl whom he had enormously improved by treatment, where it appeared from the photographs that the mandible had not been advanced. He went over the photographs carefully and it seemed to him that the appearance was a fallacious one, and that the point of the chin was pretty much where it always had been. If the mandible did come forward his own feeling was that it very rarely remained forward. With regard to the position of the chin, so many people spoke in discussing the cases as if the mandibular prominence were always the same. Of course, there might be a good chin or a bad chin with any sort of mandible. It did not follow that because the bite was post-normal that the chin was necessarily weak. Often it was associated with excellent development, a point that was often overlooked. Then the author mentioned cases which had been recorded where, after something or other was done to the upper arch, the bite had spontaneously jumped. Those cases were very interesting. The first case of the sort ever recorded was in France many years ago. n that case the dentist expanded the two canines and the whole

deformity corrected itself. It was superior protrusion in those days, and he began by expanding the canines, and the next day when the patient came she was cured. Another case was reported shortly afterwards by Mr. Leonard Matheson. He had used inclined planes to fix on bicuspids for the purpose of holding back some tooth in the jaw that he was removing, and the patient came a few days afterwards cured. They were exceedingly interesting cases. With regard to the method of treating the cases by tilting back the upper molars it seemed to him that that method had the very serious drawback that it must hamper the eruption of the third molars That the third molars did exert sufficient pressure to throw out the whole arch was undoubted.

Mr. MORRIS was sure the author had something up his sleeve with regard to post-normal occlusion, and he therefore asked Mr. Spiller to give a simple, clear and short definition of what post-normal occlusion was. The statement was made at the bottom of page 2, "If the obstruction occur after the eruption of all the temporary teeth it could not affect the occlusion." He had a case of a doctor's daughter now in which he had just completed the first phase of the treatment, who eighteen months ago developed adenoids. While he was in the process of expanding her jaws he discovered after she had been away for three or four months that she seemed to be taking up a post-normal occlusion. Again she was away in the country for three months and on her return there was no doubt about it. He had just had to insist upon putting on double arches. She was ill when the things were put on temporarily and he did not see her for a month, but in that short space of time she became normal again through reciprocal traction. He hoped subsequently to be able to show the models before the Society.

Mr. MORRIS showed a model of a case which the members might be inclined to think was Class II., Division I., but which, as a matter of fact, was Class II., Division II.

Mr. SPILLER agreed with Mr. Morris' definition of the case.

Mr. MORRIS said the chin was distinctly well developed and the whole draw seemed to be backwards. He thought Mr. Spiller was probably right about the position of the jaw being mostly in its normal relation to the rest of the cranium. He had seen three cases, two of which were now under treatment, in which the chin was in very good relation to the rest of the face. With regard to the question of the jumping of the bite, the only one he had had was in the girl to which he had referred, and she did not remain in that position. She remained fairly good on the right side, but not on the left; whereas she had gone back into the position of post-normal occlusion. With regard to the question of reciprocal traction landing them in a position of partial retrusion of both jaws, he could not help having the same opinion as Mr. Badcock about tipping the upper molars back; but at the same time he thought it was more than likely that if an upper molar was tipped back and the bicuspids came into position and the bone formed round them, it was very unlikely that any upper wisdom was going to shunt the whole of the fourteen teeth in front of them forward again. He thought the lower wisdom exerted a very considerable amount of power in the shunting of the lower teeth forward and produced a condition of irregularity in the incisors. But he did not think that would happen in the upper, because there was plenty of room behind. With regard to the question of curing the disease, he was becoming more and more in favour of extracting the first upper bicuspids for very much the same reason as Mr. Badcock had given.

Mr. RUSHTON said it was interesting to notice how opinion seemed to veer round as time went on, and how "mutilation" did not seem to

be looked upon with horror as it once was. It did not deserve the name of mutilation, but of very valuable surgical assistance in correcting cases. With regard to the question, " Was post-normal occlusion preventible ? " if they knew the cause of it it might be, but he quite agreed with Mr. Badcock that they did not know the cause. He had three children in one family under his personal observation. They had all been operated upon for adenoids, all at about the age of three. The two elder children had normal occlusions, the third child was post-normal. They had all had the same bringing up and treatment. Nevertheless, two of them were normal and the third with no assignable cause was post-normal. It seemed to him that for dentists to put the teeth of children into normal occlusion for nothing more than a purely academic principle was a wrong thing to do. It was not justifiable for the sake of making those teeth normal to subject a child to a more or less long and rigorous treatment. One of the most beautiful children he knew was a girl of sixteen, whose teeth were in post-normal occlusion, and he thought it would be unjustifiable and wrong to interfere with her mouth. When any interference had to be made he considered that what he called a surgical short-cut was the thing to do. The other day he was speaking to a lady about the regulation of her children's teeth, and saying that it would take a certain amount of time, and she replied, " There are other things in life besides teeth," and that was the parents' way of looking at the matter. Children had to crowd all sorts of things into their little existence, and to have to spend a tremendous amount of time and trouble over their teeth was a very serious matter.

Mr. J. E. SPILLER, in reply to Mr. Visick's remarks, said he had not wished to go into the methods of determining the relations of the teeth to the face and cranium, in so short a paper. Undoubtedly they had a normal position. In many cases he thought the eye was sufficient—the abnormal position of the six-year molars after early loss of the temporary molars as an instance. He thought the prosopometer would be valuable in many instances. If one accepted the suggestion of an understood co-relation he thought the classification he had suggested might prove useful in diagnosis and treatment. At present " distal " or " post-normal " occlusion (Angle Cl. II.) embraced two conditions, *viz.*, inferior post-normal and superior pre-normal occlusion, and he thought it very desirable to differentiate between them. The same applied to " mesial " or " pre-normal " occlusion (Angle Cl. III.).

With regard to the influence of nasal obstruction on the occlusion, he meant that such obstruction occurring after the eruption of all the temporary teeth would not affect the occlusion in the antero-posterior sense. Mr. Visick did not agree that Angle Cl. II., Division II. could be superior pre-normal occlusion. If it were not so it would be impossible to restore facial harmony in these cases by distal movement of all the upper teeth.

Mr. Badcock had made a very interesting contribution to the discussion and he (Mr. Spiller) hoped that more investigation of the etiology of post-normal occlusion would result. If this were never an acquired condition it was difficult to understand why it sometimes occurred without any family history. The case Mr. Badcock had shown was a rare condition and in his experience unique. Was it possible that nasal obstruction had existed on one side only ?

With regard to Mr. Morris's case, where he did see pre-normal occlusion occurring at a certain age, he took it that had occurred at the same time that he was doing some treatment to the mouth, so that it was possible the pre-normal occlusion occurred, he would not say as a

result of, but in conjunction with what was happening in Mr. Morris's treatment.

Mr. MORRIS said it was not strictly accurate to say he was expanding the jaws at the moment. He had expanded them and the patient was wearing plates when the jaws started apparently to slip back, with the result that the patient got post-normal occlusion. He was not actually doing anything at the moment.

Mr. SPILLER said it was just possible that the patient bit further back in order to avoid Mr. Morris's plate. Mr. J. B. Parfitt had made a good number of experiments with his articulator, and he found that most patients could retrude the mandible a little beyond the normal bite and a child could probably do this more so than an adult. He thought it possible that, little by little, a post-normal occlusion might occur in this way. Mr. Morris had asked him to define post-normal occlusion. He accepted the meaning in common use based on Angle's definition of occlusion, but wished to emphasize the importance of differentiation of the different kinds of post-normality. At the same time he did not think the phrase was altogether a good one, as if occlusion meant a relation between certain things, then post-normal occlusion should mean that this relation was post-normal to something else, presumably the cranium. Mr. Rushton had spoken of the value of "surgical short cuts," and he quite agreed that treatment would probably revert more to these in the future, and that the undertaking of orthodontic treatment extending over a protracted period was a matter for serious consideration.

The PRESIDENT, having thanked in the name of the Society those gentlemen who had brought forward casual communications, and Mr. Spiller for his interesting paper, adjourned the meeting to the 21st May next.

ORDINARY MEETING.

An Ordinary Meeting was held at the Rooms of the Medical Society of London, at 11, Chandos Street, Cavendish Square, W., on Wednesday, May 21st, 1913, Mr. Montagu Hopson, President, in the chair.

CASUAL COMMUNICATIONS.

An Unusual Case.

By Mr. H. Malleson.

Mr. Malleson exhibited slides of a case of a boy aged nine and a half, who was brought to him about six weeks previously. The boy was delicate, and for the last few months had suffered from dyspepsia, the probable cause of which the members would presently see.

The first slide showed the occlusal surfaces. It would be noticed that the first molars, considering the boy's age, were very indifferently erupted. The right lower molar was impacted into the temporary molar, and what were seen on the slide were the two distal cusps. The right upper molar was also badly erupted, and the left second temporary molar was impacted between the first temporary molar and the first permanent molar. In the upper jaw the incisors were irregularly spaced.

In the next slide it would be noticed that the bite at the back was open, and as a matter of fact it was, in places, well over $\frac{1}{8}''$, almost $\frac{1}{4}''$. The left second temporary molar was impacted between the two teeth in front and behind it. The anterior lower teeth bit on to the palate behind the upper incisors, and the first permanent molars were not anything like fully erupted. The next two slides were skiagrams of each side of the jaw.

The first permanent molar on the right side of the lower jaw was lying parallel to the jaw instead of vertical, and apparently there was a good deal of absorption of the temporary molar in front of it. In the upper jaw the teeth, although the molar was not erupted fully, were more or less normal, except that apparently there was very little room for the canine to come down later on. Another factor, which perhaps had something to do with the cause of it, was that the absorption of the roots of the temporary teeth in the lower was more marked than in the upper. He did not know whether that was actually a fact or whether it was due to the picture being taken from the cheek side, and consequently the roots of the temporary teeth did not show against the oncoming bicuspids.

The next slide showed the jaws on the other side, and the members would see the impaction of the second temporary molar and also the absorption of the roots of the upper temporary teeth, and not so much absorption of the lower temporary teeth.

His reason for bringing the case forward was to get some ideas for the treatment. So far, the only treatment he had undertaken was to extract the right lower first molar which was lying parallel, and the temporary molar came out at the same time. Somehow the right lower temporary canine was dislocated at the time of the extraction

and he could not get it back. That had opened the bite still further in front. He supposed he should have to remove that, unless it went back into place by the child biting on it.

The PRESIDENT thought none of the members would quarrel with Mr. Malleson's description of the case when he called it an unusual one ; and he must confess that he himself was waiting as anxiously as Mr. Malleson to hear what members would have to suggest in the way of treatment. One would like to have seen a photograph of the profile of the child, particularly with regard to the angle of the jaw. It seemed to him that the case was one which would interest Mr. Rushton—to see whether the measurements which that gentleman had suggested a year or so ago would throw any light upon the causation of the condition. He recalled a case which he saw some years ago of a man who was suffering from acromegaly and who had also an open bite at the back of his mouth. Neither his second premolar nor any of his molars were in occlusion, and he had been wearing for a good many years metal denture plates struck up, over the natural teeth, with metal cusps soldered on those plates to bring them into occlusion. The interesting fact was that the man had worn those plates for a great many years and yet showed no sign of caries in any of the teeth which were covered by those particular plates. The patient was a medical man who took scrupulous care in the matter of keeping the plates perfectly clean. He would like to ask if Mr. Malleson had any idea where the second molars were in the lower jaw.

Mr. MALLESON said they did not show in the skiagram.

The PRESIDENT further enquired whether there was any difficulty about the removal of the horizontal first molar.

Mr. MALLESON replied that there was some trouble.

Mr. BALDWIN said Mr. Malleson's contribution reminded him of a case of his own which was undergoing treatment at the present time. The patient was a very undeveloped and very delicate boy, with an extreme amount of overbite, and whose lower incisors at first were biting right into the anterior slope of the palate a long way behind the upper central incisors. It was not, however, so unusual a case as Mr. Malleson's, because the bite was not open at the back. The boy was biting on his temporary molars. In his case a tremendous amount of improvement had been obtained by simply putting in a biting plate and allowing the boy to bite on it in front with his lower incisors only. In Mr. Malleson's case, he was not quite sure whether he should not be inclined to put in a biting plate to let the boy firmly and squarely bite on his lower incisors instead of on the gum. It was just a question whether it would be advisable to put in a plate covering the molars so that he would have a bite at the back as well. It would be there for a few years at any rate until the temporary molars really wanted to be shed. He should think Mr. Malleson's patient, being a very undeveloped boy, was greatly deficient in the normal force of growth, and that the condition of open bite was simply due to that—that the jaws would not grow, lacking the proper force of growth. It was a case of sheer undevelopment and want of growth.

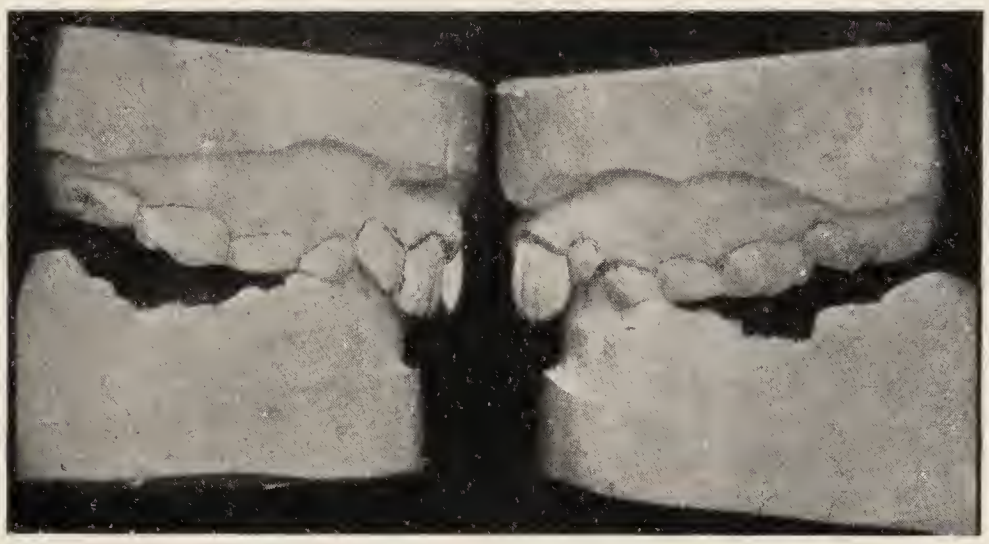
Mr. RUSHTON said Mr. Malleson's case was one of those in regard to which members would very much like to have the subject before them to have a better view of what had taken place. He did not agree with Mr. Baldwin that it showed lack of growth, but rather too great growth in a wrong direction. It reminded him first of all, when he saw the models, of those cases which had been described by Professor Keith of acromegaly in which there was a growth of the ascending ramus, and if there was an undue growth of that part of the mandible

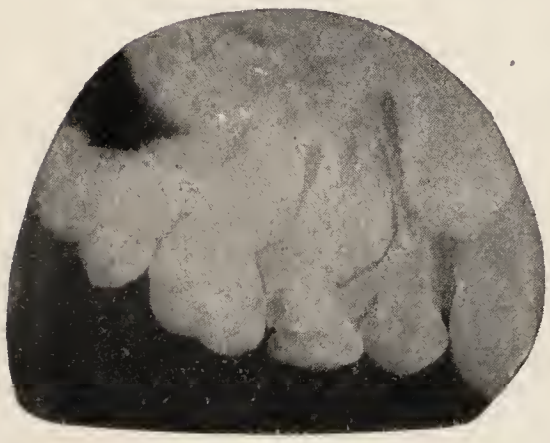
An Unusual Case.

Mr. H. Malleson's Communication.

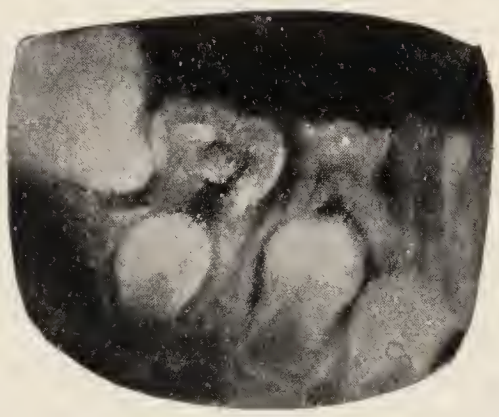
I.

II.

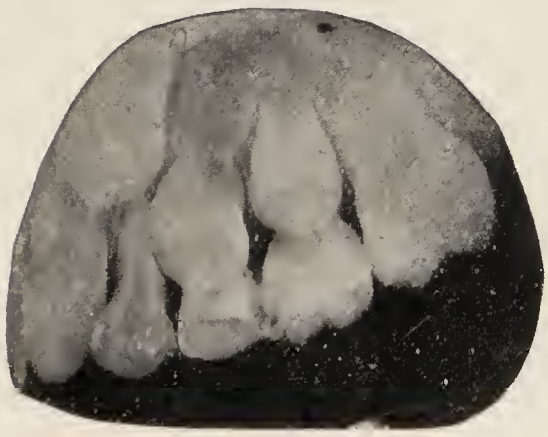




III. Right Upper.



III. Right Lower.



IV. Left Upper.

IV. Left Lower.

Unfortunate Result of a Fixed Apparatus.

Mr. F. B. Bull's Communication.

Before Treatment.

Right Side. Left Side.

After Treatment.

Right Side. Left Side.

it would naturally lead to an open bite. At the same time, the six-year old molar being horizontal, it seemed to him the same cause which would make that horizontal would be that which would make, as practitioners so often saw, the wisdom tooth horizontal, namely, want of space ; and he thought it was quite likely that there was lack of development of the body of the jaw, and perhaps an undue growth of the ascending ramus of the jaw. Those, however, were only hypotheses, and one would very much like Mr. Malleson to bring the case before some future meeting of the Society for the members' observation.

In reply to a question as to whether the boy's growth was otherwise normal,

Mr. MALLESON said the boy was not very well grown. He was certainly undeveloped. His profile was not bad. The upper teeth came over the lower lip ; otherwise the appearance was not bad.

Mr. BADCOCK said Mr. Rushton might be right as to increase of growth in the ascending ramus, but it seemed to him (the speaker) it was quite evident there was lack of growth in the maxilla generally and the mandible. In those cases, which were not at all uncommon, where the temporary teeth failed to erupt to their proper level, and some became impacted—as some people called it—it seemed to him that it was wise to extract the temporary teeth as soon as one recognised that condition of impaction, so called. He thought that once the tooth was caught in that way it would never release itself. The growth would never go on any further, and the condition would get worse and worse. Therefore he had made it a practice to extract those teeth as soon as he discovered that there was no chance of their rising of their own accord, as they should do. In that way he thought the oncoming teeth were given a better chance of erupting normally. The extraction of the one first lower molar was of course very awkward as far as the bite was concerned, but he should imagine that at the age the patient was—nine and a half—the second molar was coming well forward and probably, when it erupted, it would erupt almost in the place of the first molar, and so the deformity would not be as great as might have been expected.

Mr. NORTHCROFT said he did not agree with Mr. Rushton in his idea about the cause of the condition, but he was going to suggest to Mr. Malleson that before undertaking any line of treatment one should first try to find out what caused the condition. Looking at the model, he should have certainly thought it was caused through lack of development of the mandible and of the maxilla. He thought if the ascending ramus had become over-developed the case would almost necessarily have become a Class III. case. He should imagine that the child either was or had been a mouth-breather. There was a very marked contraction in the temporary canine region which would lead one to suppose that such a condition existed. If that did exist it was extremely likely that the antra were very poorly developed on both sides, which would account for the shortness of the upper sixes. The right lower six being impacted in the lower jaw was undoubtedly due to a shortness of the mandible ; and he thought in the treatment of the case, if he had decided, as he believed was quite correct, to remove that horizontal lying lower six, he should have removed the corresponding upper six. It would be possible, he thought, to stimulate the growth of the jaw and the approximation of those teeth by vertical intermaxillary traction. He thought that would be well worth trying, combined with the use of a biting plate to depress the lower incisors.

Mr. RUSHTON, replying to Mr. Northcroft, said it all depended whether the increase, if any had taken place in the ascending ramus,

occurred before or after the incisors had erupted. If the lower incisors locked behind the upper ones it was impossible to have a Class III. case.

Mr. MALLESON, in reply, thanked Mr. Badcock and Mr. Northcroft for their suggestions of treatment. With regard to Mr. Rushton's suggestion about bringing the child to a subsequent meeting, he would do his best, but the parents were rather troublesome people. He had to do the work when he could, and must not interfere with work, or bed-time, or meals of the child !

The SECRETARY then read the following communication from Mr. F. B. Bull :—

Unfortunate Result of a Fixed Apparatus.

Ethel M., born August 8th, 1899, was admitted as an out-patient on July 6th, 1911, with a condition of superior protrusion as shown by the first set of models and lantern slides. The treatment on the chart advised the expansion of the upper and the use of Baker's anchorage. That apparatus was apparently fitted and in use on October 12th, 1911. He could not find out whether any attempt had been made to raise the bite. On February 21st, 1912, the lower right central tooth was extracted with a very satisfactory result, as would be seen on viewing the models. On the same date the two first upper premolars were extracted, and there with regard to dates he had, to a great extent, to presume. On April 29th of this year he found that an arch had been applied to the upper jaw with anchor bands on the six-year-old molars ; and also the canines were banded, and were ligatured by means of rubber bands to the anchor bands on the six-year-old molars. By means of those rubber ligatures, and the screwing-up of the nuts behind the molars, attempted retraction had been made, with the dire result shown in the second model. As he had previously stated, he was very uncertain with regard to the date of application of that apparatus, but should imagine that it was applied soon after the extraction of the premolars, *i.e.*, about February or March, 1912. When he saw the patient in April last the gums were hypertrophied, and the teeth were in an unclean condition, but not to any marked extent ; neither were they periostitic. The apparatus was at once removed, the teeth thoroughly cleansed, and a mouth-wash prescribed. Two points to which attention might be drawn were (1) the lower incisors were biting into the palate, thereby locking the upper incisor teeth, (2) the manner in which the remaining premolar teeth on either side had been forced into the alveolus. He was afraid that the above history was rather scrappy, but the chart gave very little aid in the matter. Since the apparatus was removed no further treatment had been made. Perhaps the members present would care to suggest treatment.

The PRESIDENT thought the case might be regarded as a result either of neglect or of perverted zeal on the part of the student who had the case under his care. It showed how teeth might be dragged forward to the extent practically of one whole tooth. It was very remarkable how the second premolars had been pinched up into their sockets and thrown forward, so that the posterior teeth had come to the front, but practically no result had been found with regard to the retraction of the incisors. How much that might be due to the fact that the lower incisors were impinging very hard quite far behind on the soft tissues in the upper jaw he did not know, but it was possible they might be in a measure fixed in their position by that occlusion, and the whole force then had been thrown on the teeth, dragging them forward. He understood the child was fourteen years next

August. It was an interesting state of affairs at the present moment. There had been no attempt at expansion.

Mr. NORTHCROFT thought the case showed the very grave necessity of paying a great deal more attention to the very difficult question of anchorage, and in that connection he would draw the members' attention to a Paper written by Mr. Harold Chapman, in which he remarked that it was wise to arrive at rough proportions of the different resistances which different teeth offered as anchorage or for the purpose of movement. If the individual who treated the case which Mr. Bull had brought forward had only realized that the upper canine was the most difficult tooth in the head to shift, he would have probably used the whole weight and influence of the lower jaw, and put on intermaxillary traction, with a very careful anchorage of the whole jaw, rather than apparently relying on one miserable upper six-year-old molar to pull back that enormously strong canine with a very long root. The thing was now to try to find out the best treatment to put the matter right. It seemed to him that the sound treatment in such a case was to slowly undo everything which had been done, and practically put back the teeth into the condition in which they were before the treatment was started.

Mr. BALDWIN said the case was an object-lesson against the old method of extracting bicuspids when it was imagined that that must necessarily cure the deformity. He was thinking of a case of a patient who at twenty-five years old came to him first with a very large amount of superior protrusion, the upper front teeth projecting out of the mouth, making the lady very ugly. She had had a lot of regulation treatment previously and had had all her upper bicuspids removed in order to try and rectify the superior protrusion. When he saw her, her upper six-year-old molars were hard up against her canines and the superior protrusion was still present, about as bad apparently as ever it had been. With regard to the case under discussion he agreed with Mr. Northcroft that the best treatment would be to put on reciprocal traction and to push the molar back, if it would go back, and expand both the jaws and regulate it in the ordinary way. By the ordinary way he meant expansion of both jaws plus reciprocal traction.

Mr. NORTHCROFT said he had had the opportunity of seeing the models since he last spoke. Mr. Chapman had described the lower jaw in the original models as being in normal occlusion. It was very obvious that although the six-year-old molars looked as if they were in normal occlusion, the case was one of double post-normal occlusion originally, and the normality of the lower six on the left had only been brought about by the early extraction of the lower premolar, and it really was a case which ought to have been originally treated just as an ordinary post-normal Class II., Division 1, case, namely, by intermaxillary traction. It would have then all cleared up completely well without the slightest difficulty and without the extraction of a single tooth.

Mr. BALDWIN said there was another interesting point, namely, that in the earliest model the second left lower bicuspid had not erupted. It looked as if it had been extracted. There was a small space there—nothing like enough for a second bicuspid to go into. But in the later model that bicuspid had become erupted and occupied a good position. So that the force of eruption in that case shifted all the teeth on each side and made sufficient space for the tooth to come into place. He took it that no treatment was applied to the lower jaw, except possibly early extraction of temporary teeth.

Mr. HAROLD CHAPMAN agreed with Mr. Northcroft as to the case being one of postnormal occlusion. His object in describing the relation of the molars as they appeared on the screen was that they could be compared in relation to the molars in the second model—only to show what movement had taken place and not to what Class the case actually belonged.

The PRESIDENT, on behalf of the Society, thanked Mr. Malleson and Mr. Bull for their communications, and also Mr. W. F. Mellersh and Mr. G. Northcroft for the table demonstrations which they were about to give.

MR. MELLERSH'S DEMONSTRATION.

Cast-Gold Expansion Plates.

Mr. MELLERSH demonstrated the method evolved in his practice of constructing cast-gold expansion plates. The time available for getting the parts together for this demonstration was not sufficient to allow of an upper one being made, and he therefore demonstrated with the aid of a lower apparatus. Thin wax, such as supplied by the Dental Manufacturing Company for castings, was moulded in the usual way over the upper or lower model. A screw of the type already brought to the notice of the Society (a modification of Mr. Badcock's well-known appliance) was taken and the ends bevelled so that it might lie as closely as possible to the model. This, painted with sperm oil, was placed in position on the wax, and over this was moulded another piece of wax of the same thickness. Care is necessary when the upper portion is placed in position to be content with the first heating, it being necessary to see that it did not become so hot as to adhere to the screw. The latter being embedded, with a sharp knife the plate is divided in the centre and the two halves separated and cast in the usual way. The under surface should be finished with stones and any cribs it is desired to use fitted and soldered on. Subsequently the two halves are joined by cementing the screw in place. Before cementing it is necessary to separate the parts of the screw and file the bevelled ends of the screw square to allow free rotation when fixed in place.

DIRECTIONS FOR ADJUSTING SCREW TO MODEL PREPARATORY TO MAKING PLATE.

Fit the screw as deep into the plate as possible (and in the case of lowers as close to the gum behind the incisors as possible) consistent with sufficient length of thread being left to accomplish expansion required.

Great care must be taken, if in this process the screw itself has been bevelled, that the nuts be undone and the screw cut square at the ends to the length of the shortest side. If this is neglected it will be impossible to turn the screw when fixed in the finished plate.

The screw is made by the Dental Manufacturing Company in two sizes with lock spring. The small one is used for cast metal plates and lowers, the larger one particularly for vulcanite uppers in which case of course it must be roughened.

Mr. GEORGE NORTHCROFT also gave a Demonstration on " Unilateral Expansion " at a table, illustrating it with a large selection of appliances.

ORDINARY MEETING.

An ordinary meeting of the British Society for the Study of Orthodontics was held at 11, Chandos Street, Cavendish Square, W., on Wednesday evening, 8th October, 1913, Mr. Montagu F. Hopson, President, occupying the chair.

The Hon. Secretary (Mr. Harold Chapman) read the minutes of the last ordinary meeting held on the 21st May, 1913, which were confirmed.

Mr. Joseph Roger Brown, L.D.S.Glas., 40, Bridge Street, Uttoxeter, was balloted for and unanimously elected a member of the Society.

CASUAL COMMUNICATION.

An Unusual Accident.

By Mr. E. Sturridge.

Two years ago a patient (the subject of this communication) consulted me about the irregularity of her teeth. The condition at the time seemed to me to be dependent on adenoids, and I advised their removal before undertaking orthodontic treatment. This was done, but the parents objected to the necessary appliances for regulating the teeth at that time, the patient then being eight years old. In March, this year, she consulted me again, and models of the mouth were made which showed the condition as in Fig. 1 and 2. A case of Class II. Division II. of Angle's classification.

An appointment was made with her for five days later to commence the treatment. During this interval, the little girl, while at play, jumped off a lounge and in doing so caught the right superior cuspid (which was very prominent) in a tapestry thread, which was hanging near by, and extracted the tooth (she said without feeling any pain), as shown in Fig. 3. This model was not then taken at the time. I had a consultation with Mr. Chapman and we decided to expand the arches with Badcock expansion plates. The superior first molar and second bicuspid on the left side are depressed inwardly and occlude inside the buccal cusps of the corresponding teeth in the lower. After six months' treatment the arches show considerable expansion, as shown in Fig. 4, but the complication of faulty occlusion on the left side remain practically the same, as shown in Fig. 5, the expansion having taken place equilaterally.

Wire expansion arches were not used chiefly owing to the objections made to them by the parents, and the Badcock expansion plates are very useful for expanding and stimulating development of the jaws, but had wire arches been used, the defect on the left side could have been rectified at the same time. Arches will now have to be applied. The loss of the cuspid makes a most formidable complication and the question arises as to the best method of overcoming this defect. If the bicuspid is brought forward to fill the space, the incisors will incline also towards it, and the mesial line will move towards that side and make an unsightly appearance. The replacing of the canine seems to me to be the only course open, and the best method of doing this is a point I should like this Society to discuss.

The PRESIDENT said he would like to have seen a photograph of the child to see what sort of a face she had. He inferred from what Mr. Sturridge said that it would not be advisable to attempt to equalize matters and reduce the arch by the further loss of another tooth on the other side, and below also, seeing that the canine had gone.

Mr. H. BALDWIN asked whether there was any appearance of projection about the upper front teeth. If there was he thought it might be advisable to extract the three first bicuspids, *i.e.*, the first bicuspids except that from the quarter from which the canine had been lost; getting the teeth to fall further back and preventing the deflection of the middle line in the upper. But if there was no projection of the front teeth, he almost thought that it would be as well to let the middle line shift for itself and get slightly deflected. With regard to the faulty antagonism on the left side, he presumed Mr. Sturridge actively expanded the lower as well as the upper to the same extent, and that was why the faulty antagonism still remained. It would be quite easy to correct that by continuing to expand the upper and by dragging in the lower on that side. He also desired to ask whether the left canine was a perfect tooth. In two of the models it appeared to have the point broken off. If it was a broken and ugly tooth it might modify the treatment. One would not in that case extract the bicuspid behind it.

Mr. W. F. MELLERSH, in dealing with the question of the missing canine, said he might be wrong but he believed he recently came across an article in one of the illustrated American journals showing a replantation, a subject which was exciting interest again in certain quarters. He did not know that one would attempt to try replantation in the case mentioned, but it was possible it might be as well to look up that particular article and see if anything fresh had been done in that direction.

Mr. GEORGE NORTHCROFT said he would undoubtedly have refused treatment in the case if an arch had not been tried. There was a post-normal occlusion, and the only thing to do was to straighten the front of the mouth, to put the upper sixes backward and get the occlusion normal in that way. He thought an attempt to correct post-normal occlusion with a Badcock expansion plate alone was simply courting trouble. That, however, did not answer Mr. Sturridge's question as to what to do with the space. Personally he should leave it alone.

Mr. STURRIDGE, in reply to the questions asked, said that the extraction of the tooth on the other side would be absolutely wrong. The great lack of development in the incisor region was quite obvious, and needed to be corrected. Besides, it would be necessary also to extract in the lower jaw so as to equalize the articulation all round. He thought it would make a most peculiar appearance if that bicuspid was brought next to the lateral. In reply to Mr. Baldwin, although the canine appeared blunted in the model, it was quite a good tooth. The extraction of a tooth other than the canine on the other side and bringing the bicuspid up to the lateral on the left side would also, in his opinion, be a disfigurement. There was great lack of development in the region of the incisors, and his object in putting in Badcock plates was to stimulate the development of the jaws all through, and not so much to correct the irregular teeth at present. He quite realized that the Badcock expansion plates would expand both sides of the arch, but it would not do to expand the upper jaw and stop expanding the lower jaw, because the same defect would be present in an aggravated form on the opposite side. All the upper teeth would then be right over the articulation of the lower. It was his intention to put

"An Unusual Accident."

Fig. 1.

Fig. 2.

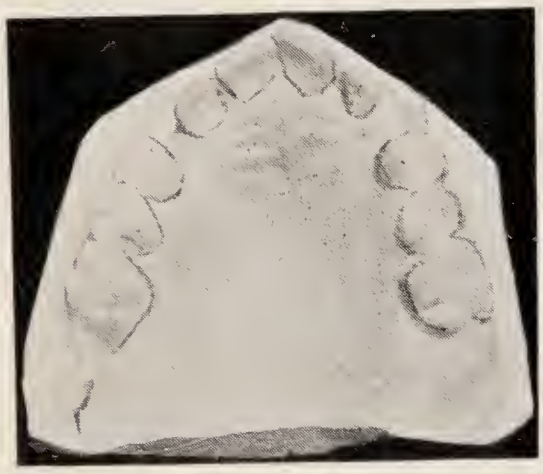


Fig 3.

Fig. 5.

Fig. 4.

To Illustrate Mr. E. Sturridge's Communication.

arches on, to pull the incisor teeth to them and also correct the post-normal occlusion. Mr. Mellersh's interesting suggestion he had not thought of, and there was probably more in it than some of the members thought. Later on it might be possible to replant a canine in the place of the one that had been lost. The tooth was extracted during the week-end ; he was told nothing about it, and when he applied for it it was lost. It was more likely than not that it was not thoroughly developed at the apex, and would be useless for replanting. He could not have replanted it in the same socket, because he had to regulate the case afterwards, and that would not have done. He perfectly agreed with what Mr. Northcroft had said as far as post-normal occlusion was concerned, but he used Badcock expansion plates after consultation with Mr. Chapman in order to stimulate the development of the jaws. Now that the jaws were developing he proposed to wait for six months longer, then to put the arches on and correct the post-normal occlusion, getting the incisors further out so as to make ample space for a canine. He thought of putting the canine in on a small retaining plate, holding it there while keeping the teeth apart, and then possibly attaching a dummy tooth on to the biscupid later on. The appearance of the child was such that if the arches were not expanded and the incisors brought forward there would be a peculiar appearance in the mouth which would spoil the look of the child.

Professor Arthur Keith, M.D., F.R.S., then read his paper on

Certain Factors in Tooth Eruption.

The best paper which can be brought before a meeting such as this is one which enunciates and proves a new principle—a principle applicable as a basis of treatment. The paper which I am now to contribute does not belong to that class ; it is in reality merely a preliminary endeavour to explain certain facts connected with the growth of the jaws and eruption of the teeth, which are at present overlooked or regarded as merely due to mechanical causes.

The growth of the jaws and the eruption of the teeth are part and parcel of the great problem of bone growth. How are the millions of osteoblasts which build up the skeleton of the human body co-ordinated in their work ? We shelve the difficulty of the problem by ascribing to them certain inherited tendencies and conceive that they could not work otherwise than they do. Over and above these "inherited tendencies" there must be some mechanism for co-ordinating the growth of the various parts. No better instance can be cited than the manner in which the growth of the upper and lower jaws is regulated, so that, in normal faces, both proceed at the same pace, the upper and lower teeth erupting so that they come into proper opposition. The complex mechanism of growth in the upper jaw is better seen in man's nearest allies than in his own jaw. In Fig. 1 I repeat an old diagram to show the growth of the upper jaw and eruption of the teeth in the gorilla. In order that accommodation may be made for the permanent molars, the maxillary part, carrying the milk dentition, is pressed downwards and forwards—away from the pterygoid fossa—until a sufficient addition is made to the alveolar border to accommodate the permanent molars. The diagrams assist one in understanding how complex a process is the growth of the upper jaw and eruption of the permanent teeth. At the same time the lower jaw is growing

at a corresponding ratio, if the upper and lower dentition are to come into correct opposition. The complex nature of the growth of the lower jaw is well known, but I give here a sketch of one of Hunter's experiments on madder-fed pigs; his experiments definitely established the fact that the main growth of the lower jaw takes place along the hinder and upper border of the ascending ramus. The growth along those borders must be co-ordinated with the growth processes in the upper jaw. At first sight it may be thought that mechanical movements—the reflexes elicited through the nervous system, during mastication—may prove sufficient to correlate the growth of the upper and lower jaws. There is evidently also another factor—internal secretions, hormones, call them what you will—at work. It is evidence in favour of that factor to which I wish to draw your attention.

FIG. 1.—Stages in the growth of the upper jaw of a gorilla. I. At the end of milk dentition; II. After the first molar is cut; III. At full dentition.

FIG. 2.—Sketch of lower jaw of a young pig which Hunter fed for a time on madder. The bone laid down during feeding with madder is shaded.

In the disease at present known as acromegaly there is, at first, an adenomatous condition of the pituitary body and a disturbance of growth. All the tissues of the body are affected, but not from a general hypertrophy; the parts acted on are selected according to some functional law at present not well understood. The parts concerned in mastication suffer more than the rest of the body. The temporal muscles are enlarged; the temporal crest and lines from which these muscles arise spread upwards on the side of the skull and enlarge the areas for the temporal muscles. The external angular processes of the frontal grow; so do the supraorbital ridges which are certainly parts of the bony scaffolding of the apparatus of mastication. The zygoma enlarges; so do the articular eminence, glenoid cavity and tympanic plate. The growth of the mandible, which had ceased when adult life was reached, again wakens up and new bone is laid down at the condyle; the ascending ramus elongates and the lower and upper teeth are thrown out of apposition. The changes are well shown in Fig. 3. There is growth along the alveolar process and the teeth separate; also at the chin

FIG. 3.—Profile of skull, showing the characteristic changes of acromegaly—from a specimen in Seaman's Hospital (Dreadnought) Museum.

and lower border. The outer casing of bone on the roots of the teeth (crusta petrosa) thickens in chronic cases. Except in cases of giantism the palate does not enlarge, but there is extra growth in the superior maxilla, for the upper face elongates. The alveolar border of the upper jaw deepens.

We must suppose, to account for these facts, that in acromegaly some pathological manifestation of a normal growth mechanism has taken place. At the present time we presume that the secretion of the pituitary has some direct influence on bone growth. It has apparently a regulating or co-ordinating influence, for as we have seen it picks out—in an irregular way—all the parts connected with mastication. The manner in which we suppose this particular secretion of the pituitary acts is this: it somehow sensitizes the osteoblasts of the masticatory apparatus—not only wakens up growth in them, but renders them highly susceptible to the mechani-

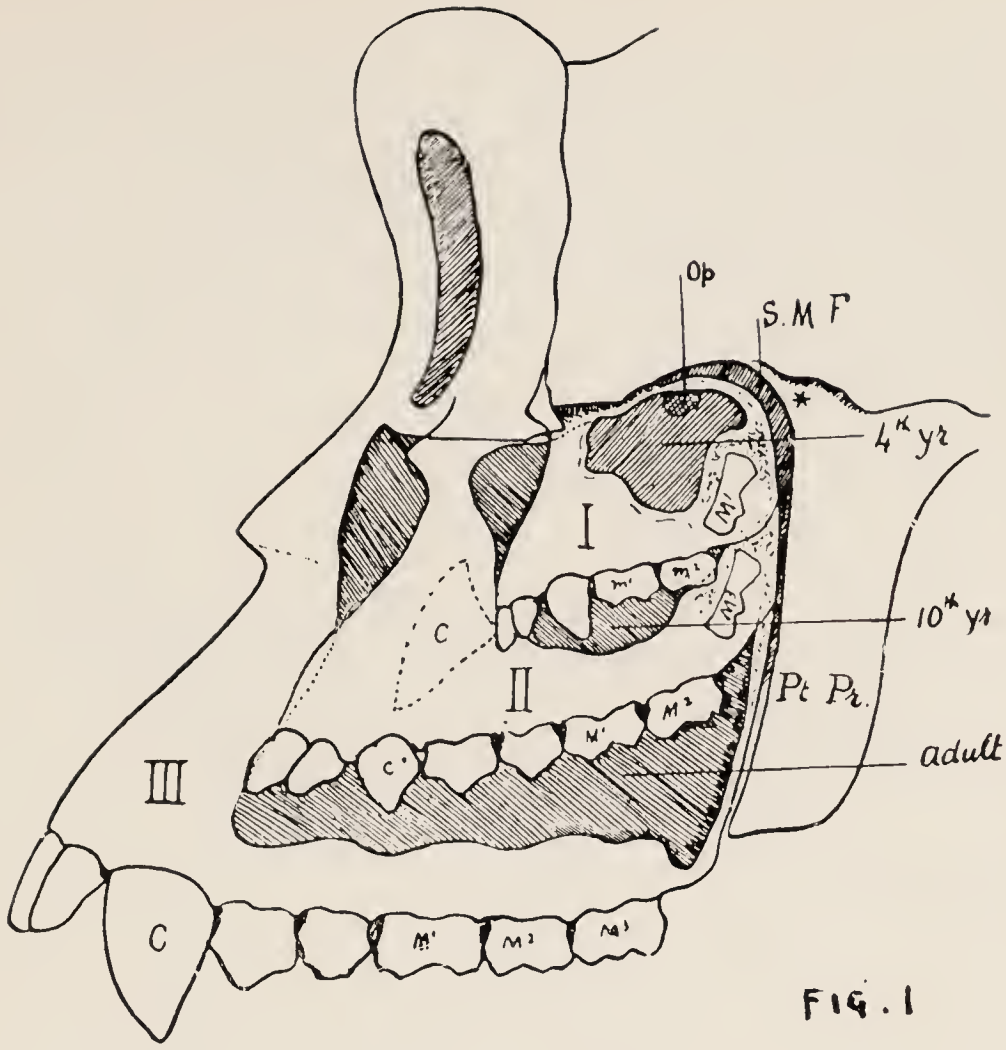


FIG. 1

PIG'S MANDIBLE.

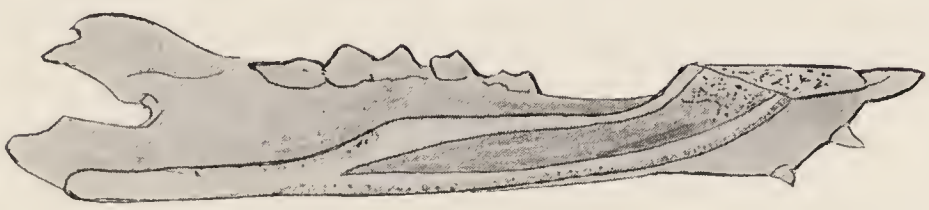


Fig. 2. Younger stage.

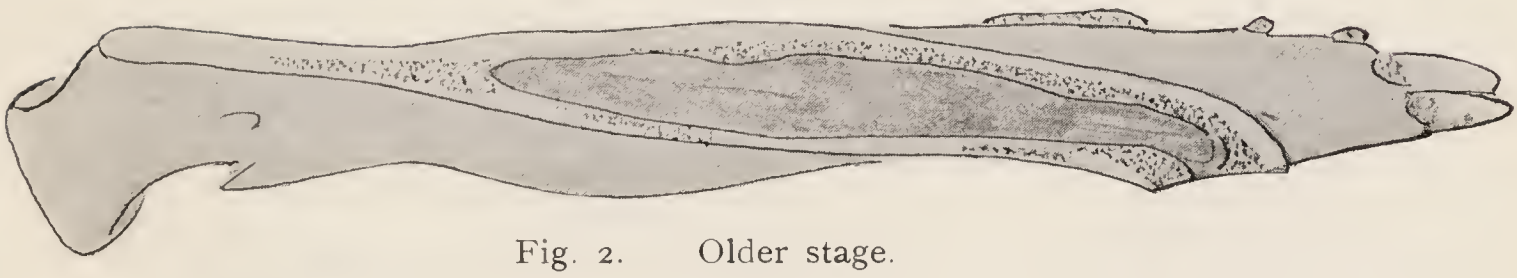


Fig. 2. Older stage.

Fig. 2.

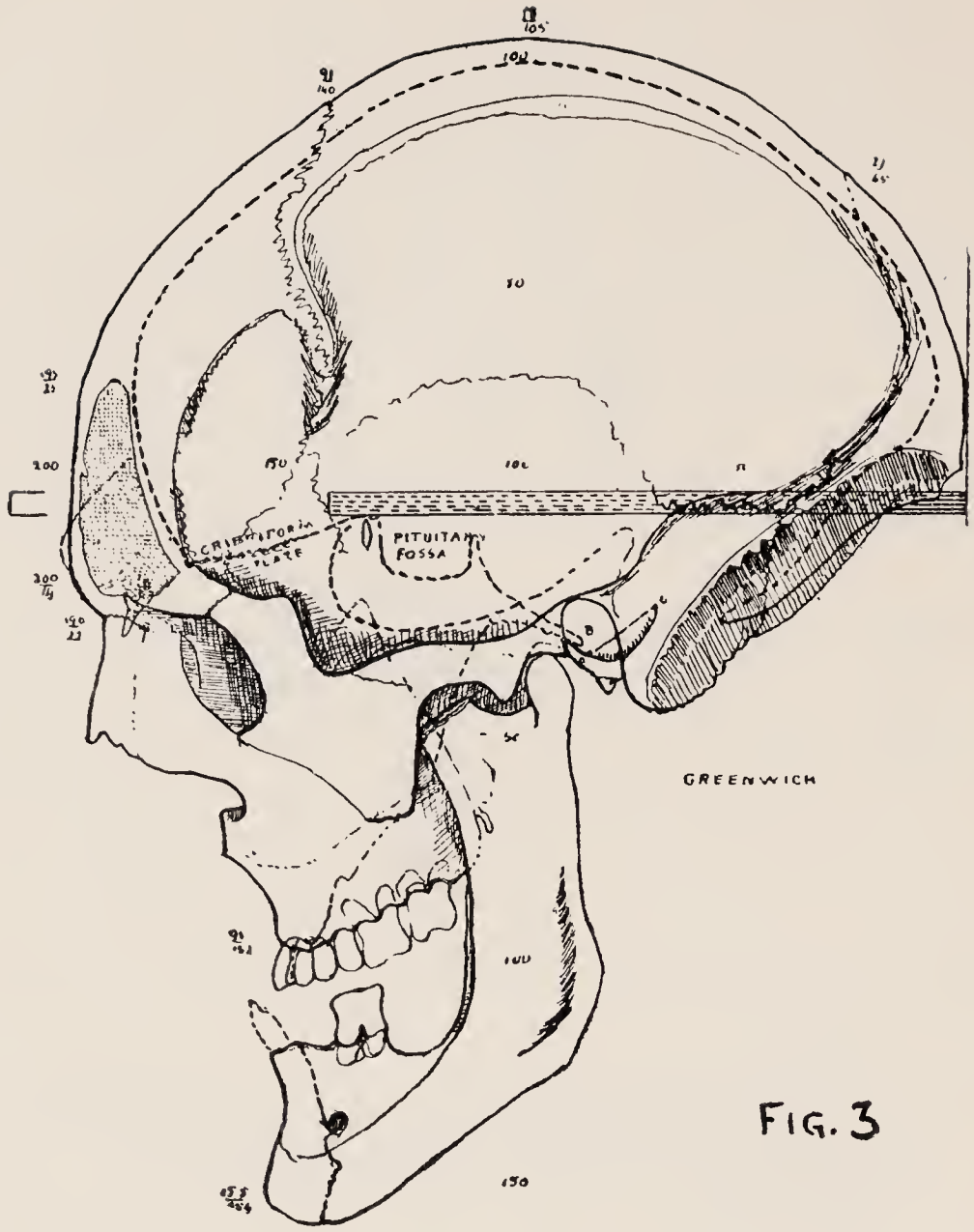


FIG. 3

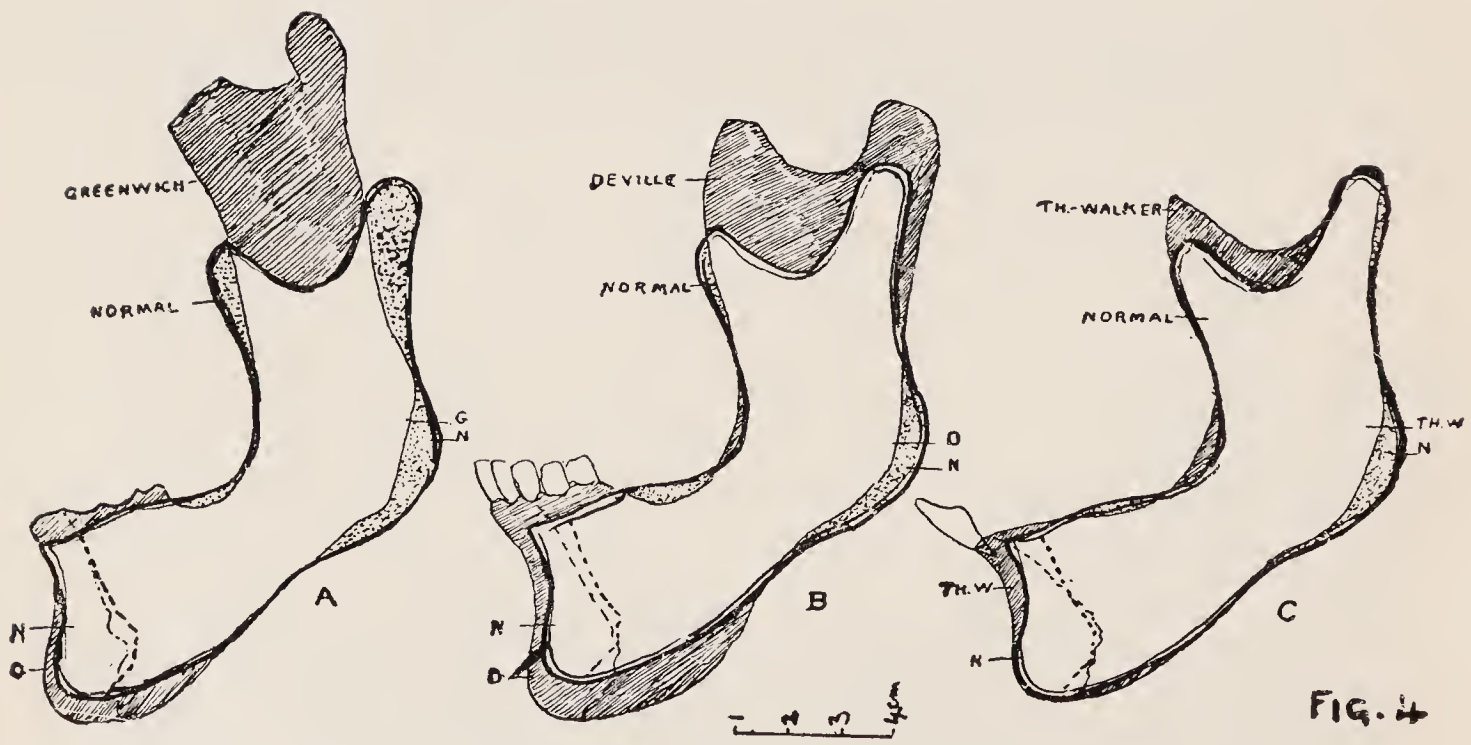


FIG. 4

Growth of Mandible in Acromegaly.

cal influence to which they are subject when in action. In youth, osteoblasts are normally sensitive to mechanical influences. When adult life is reached they relapse into a passive phase. In acromegaly their youthful phase is restored—but in a morbid and disordered state. Is it not possible that some or many of the irregularities of tooth eruption may be due to a non-sensitive condition of the maxillary peri-dental osteoblasts due to a defect or deficiency in the internal secretions of the body ?

FIG. 4.—Growth of the lower jaw in three cases of acromegaly. The mandible superimposed is that of a normal person.

The supposition that a deficiency in the action of the pituitary body—the condition of hypopituitarism—leads to undergrowth of the jaws and irregularities of the teeth is supported by a study of the disease which Mr. Hastings Gilford was the first to distinguish and describe under the name of Progeria. Thanks to Mr. Gilford, the Museum of the Royal College of Surgeons was able to obtain a specimen of this disease. In Progeria all the parts which, in acromegaly, are overgrown, are undeveloped or irregularly developed. This is particularly the case as regards the apparatus of mastication. A view of the skull of a boy of eighteen, the subject of this disease (Fig. 5), shows that the temporal muscles are restricted in size and that the temporal lines are ill-marked and situated low on the sides of the skull. The eyebrow ridges are scarcely developed ; the external angular process is small ; the zygoma very fragile. The palate is small and as will be seen in Fig. 6, the permanent teeth are

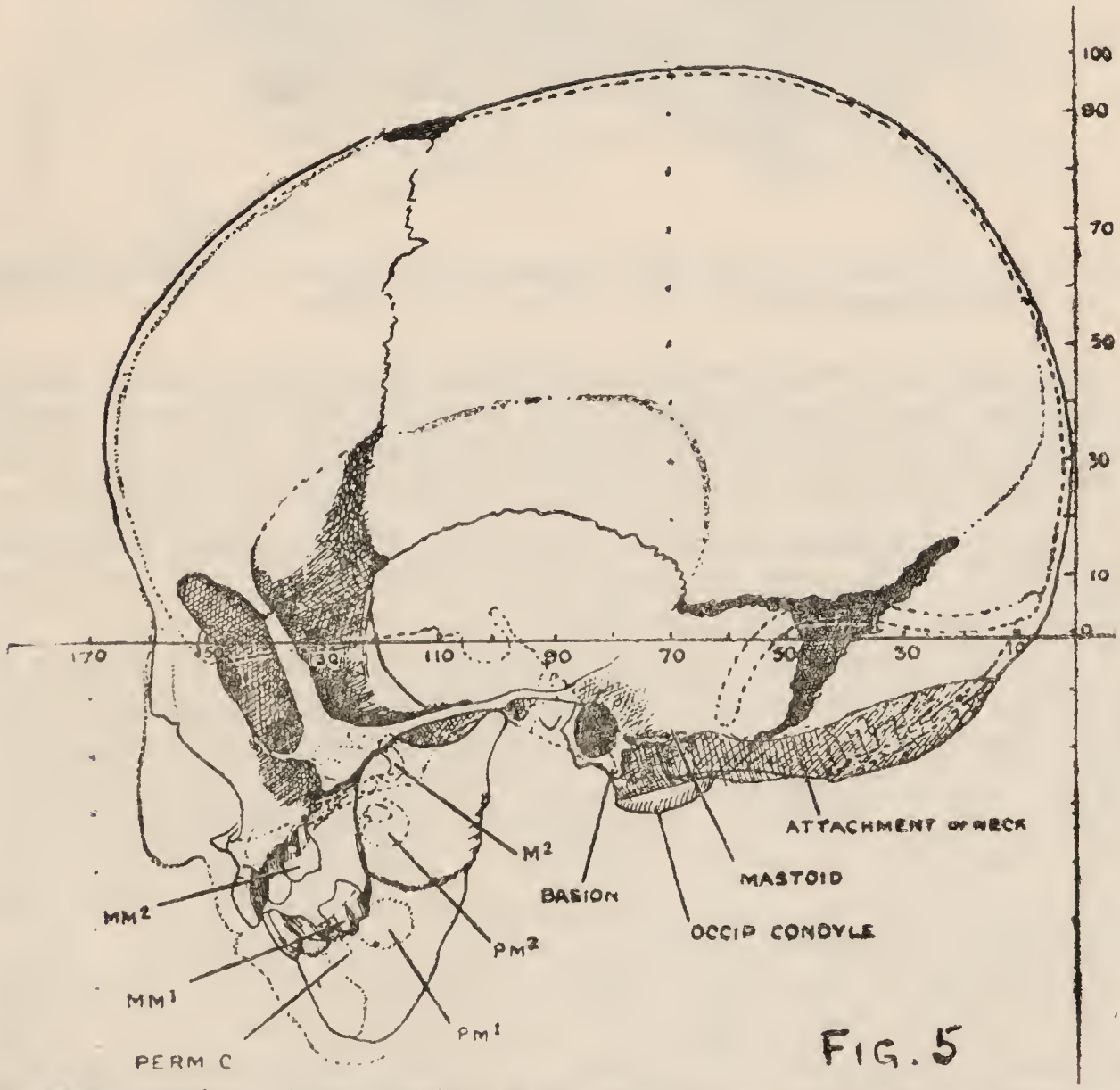


FIG. 5.—Drawing of the profile of the skull of a boy, aged eighteen, the subject of progeria.

struggling to appear on an alveolar area not larger than in a child with its milk dentition. Here the irregularity of the teeth and smallness of the palate are extreme, but may it not be that those minor irregularities, which we are at present ascribing to adenoids, are really due to a secretory disturbance, and may not adenoids, which are apparently connected with the process of growth—have a similar origin.

In progeria the condition of the lower jaw is altogether remarkable (Fig. 6). It retains the general shape of the mandible of a newly-born child, but in size it exceeds it (see Fig. 7). The lower teeth in this case, are appearing irregularly. On the inner side of the coronoid process a premolar is coming through.

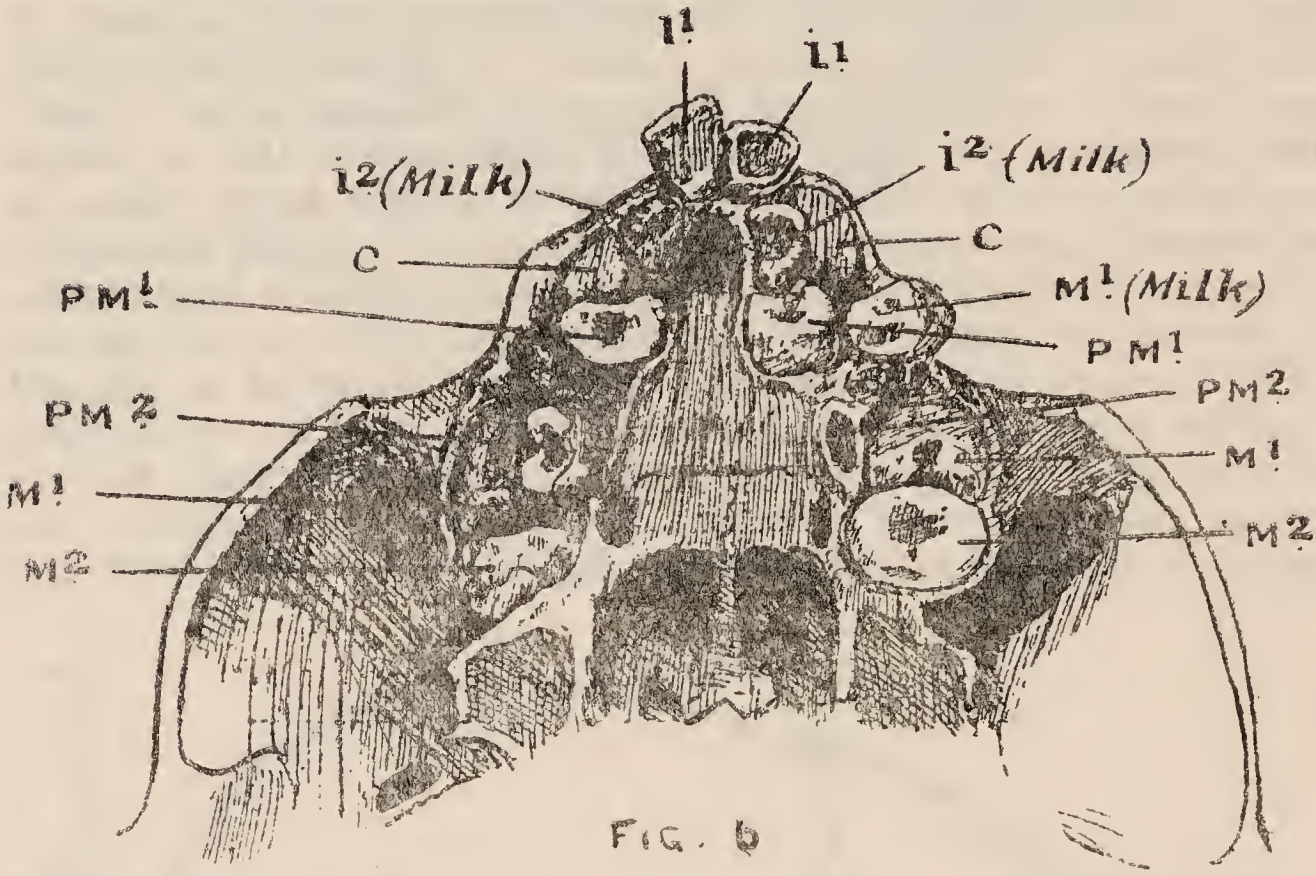


FIG. 6.—The palate of a boy, aged eighteen, the subject of progeria. There is extreme irregularity in the eruption of the teeth.

Although the condition of the skeleton in progeria points clearly to the fact that we are dealing with a condition which is the exact opposite of acromegaly, the evidence relating to the actual cause of the disease is not yet established. In this case the pituitary was not examined and the condition of the base of the skull is somewhat imperfect. Such parts of the pituitary fossa as are still preserved indicate that that body was small.

I am now to pass on to a third condition in which bone growth is disturbed, to show you that the growth of the jaws is influenced by internal secretions. The disease I shall instance is that of achondroplasia. In that disease there is a marked change in the appearance at the epiphyseal lines. The picture is that of stubborn cartilage cells refusing to immolate themselves and allow osteoblasts to occupy their spaces. The recalcitrancy of the cartilage cells leads to a slowing, or arrest, of bone growth at epiphyseal lines. Now, so far as concerns the jaws, we have nothing to do with epiphyseal lines, hence, in most cases, of achondroplasia there is no marked deformity of the jaws. In certain cases, however, there is a marked change—especially in the upper jaw—especially in those cretinoid

cases where we may reasonably suspect that the thyroid gland is at fault. In these cretinoid cases a bull-dog condition of face is produced—one for which my friend, Mr. R. R. Marett, gave me the name of Simoprosopia. The actual condition is well illustrated when the profile of a bull-dog's skull is superimposed on that of a normal dog. All the region of the face round the nose is undergrown, with the result that the palate is tilted upwards in front and the perinasal part of the face is drawn inwards. In the Museum of the College of Surgeons is an Egyptian achondroplastic skull showing the condition which I have named Simoprosopia. It will be seen that the perinasal part of the face is retracted and the anterior part of the palate is tilted upwards. The palate, however, is not small, nor is it contracted. I simply cite the condition to show you that the thyroid also may play a part in regulating the growth of the face and jaws. So far as it influences the jaw it is a factor in tooth eruption.

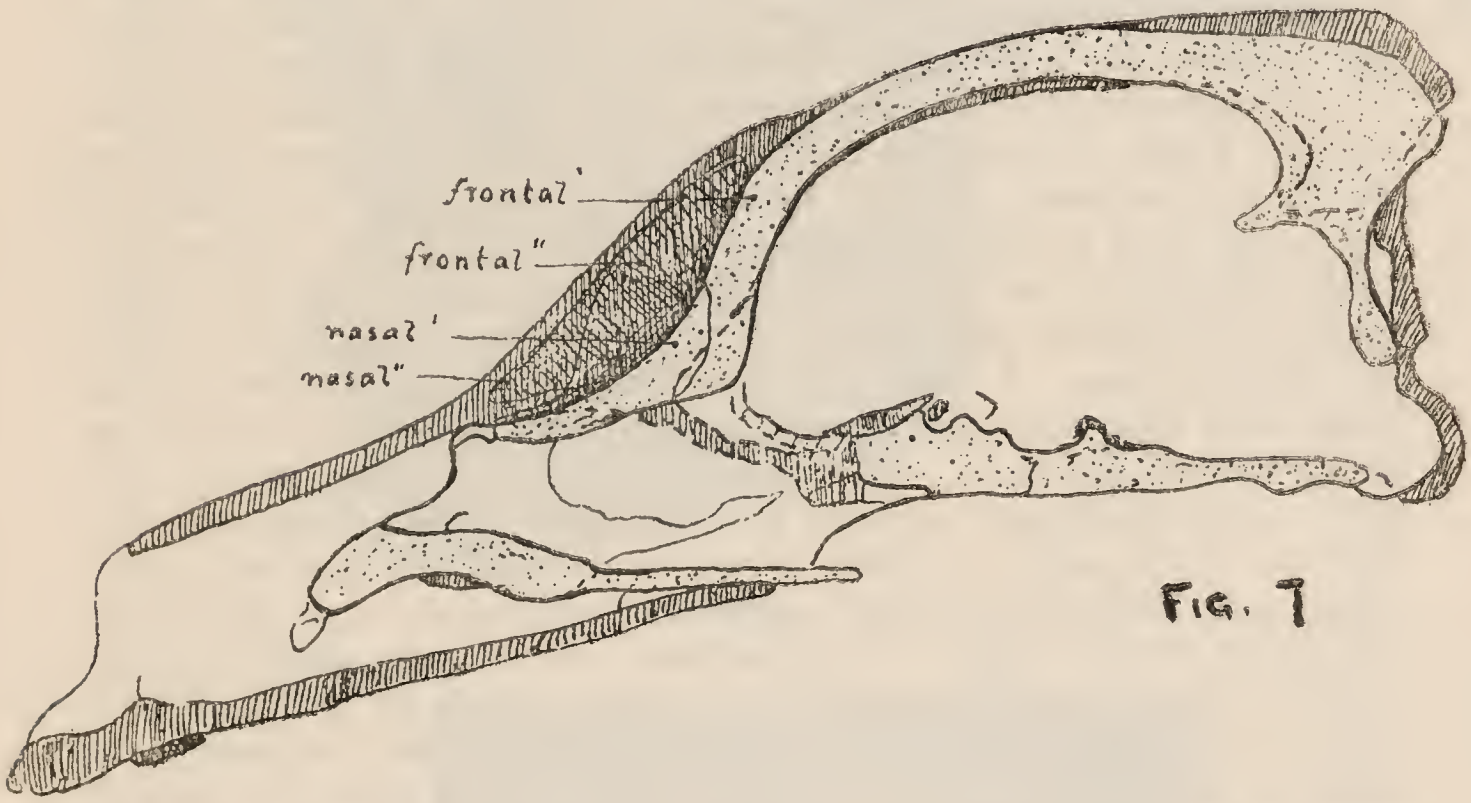


FIG. 7.—Skull of a bull dog superimposed on that of a normal dog to show the undergrowth of the perinasal part of the face.

FIG. 8.—Facial part of the skull of a cretinoid subject of achondroplasia to show the tilting up of the palate and retraction of the peri-nasal part of the face (opposite to next page).

There is another generalized form of defective bone growth to which I have paid considerable attention—osteogenesis imperfecta. The actual cause of this disease is as yet unknown, but we may safely assign it to the class arising from defects of internal secretion. In all the adult cases of this disease I have an opportunity of examining, the teeth are lost at a very early stage of life; the alveolar process is completely atrophied; the palate is exceedingly thin. The atrophy of the alveolar processes exceeds in degree that seen in very old people.

So long as we merely speculate on the causation of generalized diseases, the theory of internal secretory effects is easy of application. Where, however, we come across cases of localized overgrowth in toes, or parts of a limb, or—as in the case shown in Fig. 9—where the upper and lower jaws of one side only are hypertrophied, the explanation becomes more difficult.

The condition shown in Fig. 9 is a true unilateral hypertrophy, but in the specimens illustrated in Figs. 10 and 11 the condition although unilateral is not true hypertrophy ; it is an irregular deposition of bone, in which all bone form is lost.

FIG. 9.—Photographs of the palate and full face of the skull of a boy, aged 8½ years. The palate, the upper maxilla, the lower maxilla, temporal fossa and tympanic plate in the right side are greatly overgrown. The teeth on the right side are much larger than those on the left, or normal side.

FIGS. 10 and 11.—The upper and lower jaws of a skull presented to the Museum of the Royal College of Surgeons by the late Sir Jonathan Hutchinson. There is an amorphous deposit of bones over the area of the fifth nerve —confined to the right side.

The specimen I show you is that of the skull of a boy aged 8½ years. On the right side the upper and lower teeth, both milk and permanent, are much larger than on the left or normal side. The parts concerned i mastication—jaws, zygoma, temporal, fossa, tympanic plate—are much larger on the right than on the left side ; the overgrowth is definitely limited at the middle line of the face. The overgrowth on the right has twisted the face towards the left. At first I did not suppose that such localized conditions could be due to any secretory effect. Recently Mr. Macadam Eccles showed me a girl with a similar overgrowth of the right side of the face, with enlargement of the veins, arteries and nerves on that side, and also a distinct enlargement of the pituitary body, very visible on the skiagram. I have also seen localized hypertrophies in the skull with irregular enlargement of the pituitary fossa. How can we explain such cases : At the present time I explain them in this way : The pituitary secretion I suppose to act as a sensitizer and the particular point at which it acts is the junction between nerve fibre and functionating cell—between osteoblast and the nerve terminals which supply the osteoblast. Now, one could imagine that the hypersensitive condition—which leads to overgrowth—may be determined by the neuro-cellular functional substance as well as the secretory or sensitizing agent, and that in localized defects the primary lesion is not in the secretory agent, but in the neuro-cellular. Whatever the right explanation may be there can be no doubt that in these localized, as in the generalized disturbances of growth, we are witnessing what should prove to us instructive experiments performed by nature. They are experiments which suggest that growth—tooth eruption is a manifestation of growth —is regulated by hormones or internal secretions.

In conclusion, I want to make my position quite clear. The eruption of teeth and the growth of the jaws is not controlled only by internal secretions. Such substances can, at the most, only sensitize the growing tissues and render them susceptible of those agencies which we know do alter and regulate growth—normal actions—the mechanical impulses which arise from the natural use of parts. From a practical point of view I cannot conceive sero-therapy replacing the means dentists now use, but I can conceive that they may prove an adjunct to the mechanical methods now at your disposal. I can conceive that such agents may render growing bone more sensitive, more plastic, in the hands of dentists, thus making corrections of irregularities more easy.

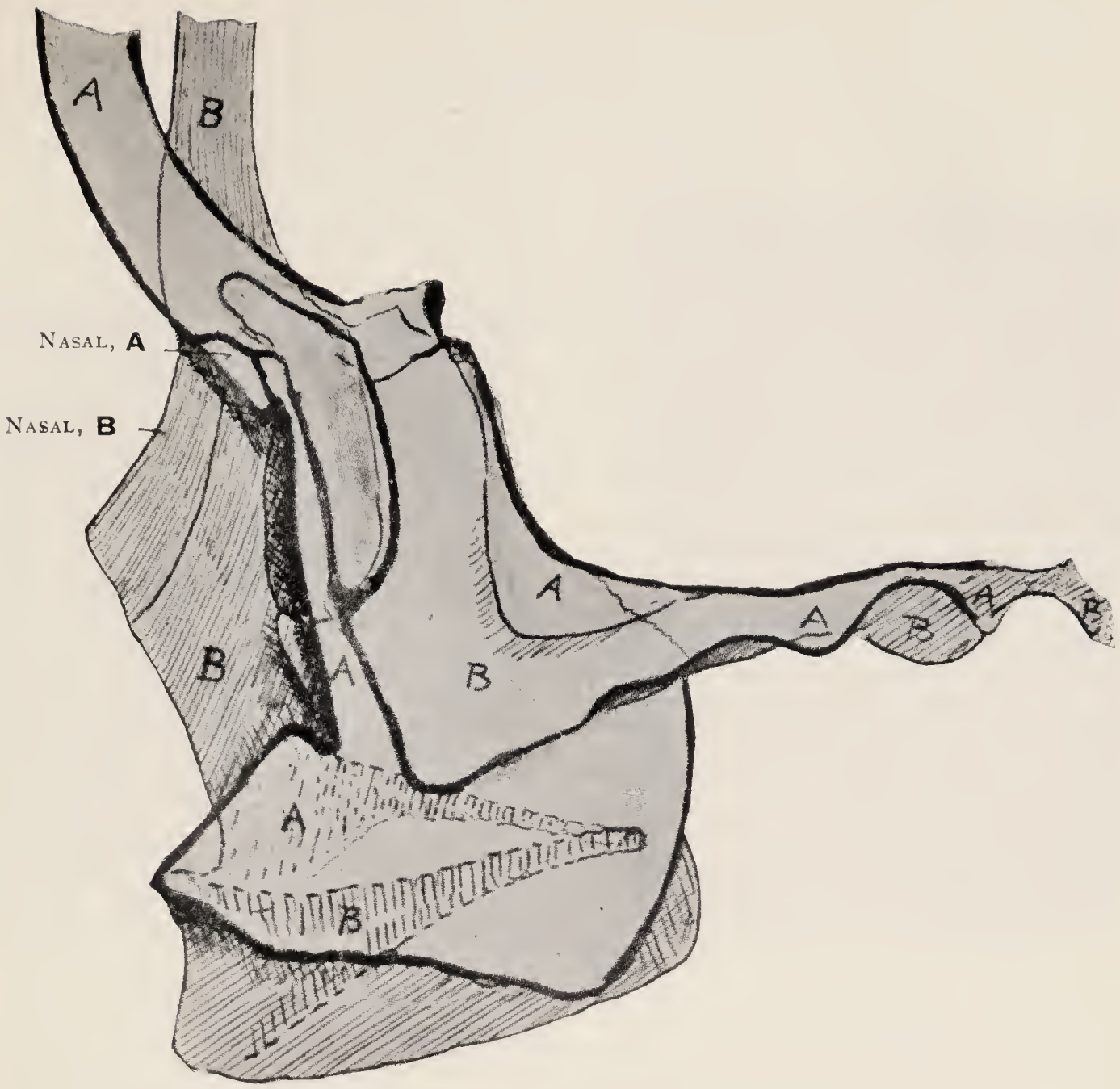


Fig. 8.

Fig. 9.

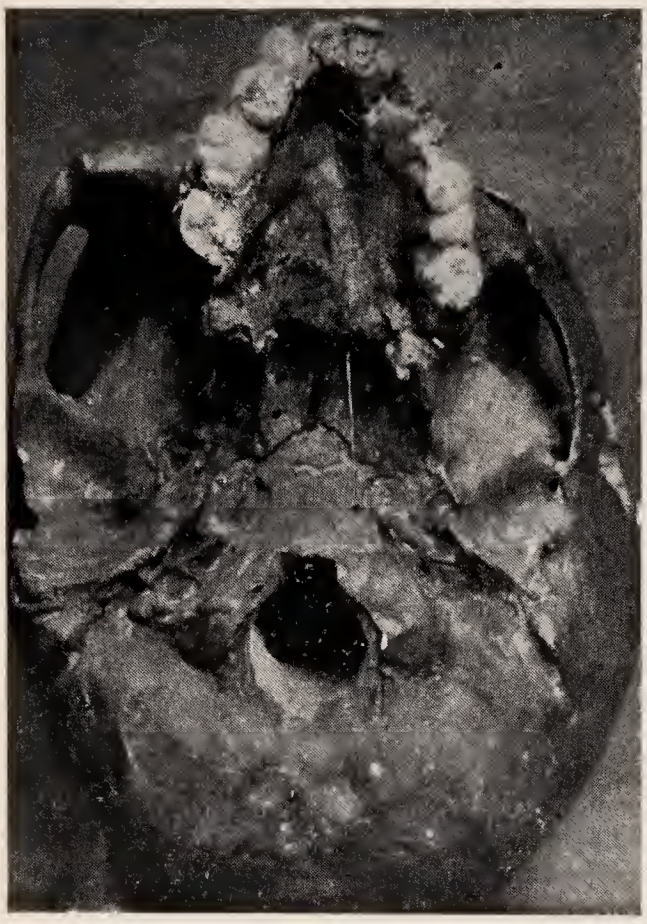


Fig. 9A.

Fig. 9B.

Fig. 10.

Fig. 11.

Discussion.

The PRESIDENT thought the author had given the Society some lines for new investigations, but it seemed almost hopeless to discuss such a paper, many of the facts which had been brought forward being entirely new to many of those present. Several things had passed through his mind whilst the author had been speaking, one being how they were to classify the facts stated. There was Angle's, Spiller's and many other forms of classification, but it would be exceedingly difficult to place some of the cases which the author had brought forward in any known form of classification. Some of the members might not have expected such a paper. From its title, "Factors in Tooth Eruption," they might have imagined that the author intended to bring forward factors which actually made a tooth erupt as dentists understood the term, but personally he knew differently, because he had been in communication with the author on the subject. He did not feel at all qualified to discuss the paper, but he hoped Prof. Keith would allow it to be reproduced in the Transactions with many of the illustrations, so that the members would be able to carefully read it and learn all they possibly could from it.

Dr. SIM WALLACE said he was interested in the question under discussion, but was a little puzzled to know what to say. He did not think the paper had thrown any practical light on the subject at all. As far as he could gather from the paper, the efforts of the members to regulate teeth by mechanical means were to be put on one side more or less, and some brilliant genius had to find out the appropriate internal secretion for stimulating the growth of the jaws in such a way that post-normal occlusion and the various other things that worried them would thus be rectified. He doubted very much whether any internal secretions administered by the mouth or injected would be of any value in the cases with which they had to deal. Consequently he contended that Prof. Keith had referred to conditions which seemed to have no relation whatever to the causation of irregularities as they knew them in 95 or more probably 99 per cent. of the cases with which they had to deal. He had never seen a case of progeria and he doubted whether he had ever seen acromegaly. He had seen people with pronouncedly grown jaws which might be said to be due to acromegaly, but they were extremely rare in his experience. Prof. Keith seemed to indicate that all changes in the position of any cell, organ or any other thing must ultimately be brought about mechanically; the internal secretions of course might liberate certain energy to do it, but it was all ultimately mechanical. There was no spiritualism about the malpositions of teeth. Growth would and did take place in the length of bones independent of use or disuse. It was known that when a child went to bed with scarlet fever, for example, he rose up a few weeks later distinctly longer. There was no necessity for use or disuse to stimulate growth in length. On the other hand, it was known that certain forms of growth depended largely on muscular activity. The thickness of an arm, for example, might be increased; the thickness and roughness of the bony surface were often increased by considerable muscular activity, so that a blacksmith's radius no doubt would be found to be thicker and much more marked than in one who never used a hammer at all. It happened in the jaw in a peculiar way that deposition of bone was always on the surface except at one place, *i.e.*, the epiphysis under the condyle. If there was an exceptional case where cartilage did not cease growing due to internal secretions, it would go on growing he had no doubt, but those cases were extremely rare. A thing to be noted was that, in so far as internal secretions were concerned, these were hereditary, whereas irregularities of the teeth were generally

speaking not hereditary. Hereditary factors could not be controlled and there were no doubt cases where a hereditary transmission might occur such as acromegaly. Generally speaking, however, it was something which was brought on, as it were, from the outside, such as ill-health, which caused irregularities. Ill-health no doubt interfered with growth. How it did so, whether through the secretions or not, it was difficult to say. In all probability it was through the secretions or through the nerves. The laying down of the jaws and teeth in orderly succession was made extremely difficult to comprehend if one tried to imagine that it was brought about by internal secretions without mechanical control. Some of the members knew that the tongue lay inside the mouth, and could be depended upon if things were normal to act as a common dominator for the upper and lower jaws. If the mouth were kept habitually open it was well known that the tongue would not act as such a common dominator ; in other words, the irregularities associated with mouth breathing were obtained. It simplified matters considerably to keep the mechanical factors well to the fore. Prof. Keith had referred to the lack of knowledge with regard to the underlying pathology of a bulldog's face. They did not know the pathology at present and never would know it. The bulldog's face was a peculiarity that had been brought about by selection. It was no more pathological than a pug nose in a human being. It was not a pathological condition, such as progeria and acromegaly. There was a succession of bulldogs bred with very considerable accuracy in type, and that could not be called a pathological condition. The face was a curious looking one but it was not what could be called pathological ; it was inherited and inbred, and was exactly the type of dog that was wanted by those who happened to want it.

Mr. W. Rushton disagreed with Dr. Sim Wallace's statement that the paper had not thrown any practical light on the subject. Personally he thought the paper was one of the most interesting that had been given before the Society for a long time. It was full of suggestive thought. The author went much deeper into the sea of knowledge than most of the members had ever thought of, much less attempted. There were various points in the paper which might be touched upon with a certain amount of benefit. The author had stated that in his researches he had not found the edge-to-edge bite, until comparatively modern times. It was a curious fact, which he had no doubt was known to the author, that the negro in the United States of North America, when he was first compelled to emigrate to that country, had an edge-to-edge bite, but now after some three hundred years had elapsed it was orthognathous. It would be interesting to know what that was due to, and he hoped the author would refer to the point in his reply. Mr. Norman Bennett seemed to think people were going still further in that direction, and that the condition which was so often seen at present of post-normal occlusion as it was called was becoming normal so to speak in many young people. Mr. Norman Bennett's own child, without any reason so far as he knew, had that condition, and personally he knew many other children who, from no recognisable cause, were affected in the same way. With regard to the conditions of acromegaly and progeria, those who had been to the College and had had the pleasure of talking over the point with the author knew that the problem was a most interesting one. The skeleton of the boy that had been exhibited as a specimen of progeria was extremely small, and thus differed very much from the conditions which orthodontists met day by day. They found well formed children, healthy and strong, developed in every other way, but who possessed contracted arches to a most extraordinary extent. If there was some

physical condition present in these children one would naturally expect the whole of the bony skeleton to be affected in a more or less similar ratio as in progeria, but the only condition present was that the upper arch or the lower or both were contracted. Why was that ? Some reason had to be found for the phenomenon, and the most reasonable one seemed to be that of breathing through the mouth instead of through the nostrils. In breathing through the mouth the jaw was open, the muscles contracted, and consequently the teeth, owing to that pressure, were forced forward. A short time ago Mr. J. G. Turner exhibited a series of models of young people who from a very early age had had to use a tracheotomy tube instead of breathing through the nose or mouth. Those jaws were without exception well formed, although he did not say they were perfectly formed. None of them showed that contracted appearance which practitioners met with from day to day, and it seemed to him that was a very strong argument for what he contended. It was well known there were many children who had adenoids whose mouths were well developed. He thought at one time there was no such thing, but he had proved that there were many cases of adenoids in which the jaw was well developed. In his opinion it was not the adenoids being present or not being present that caused it, but the mouth breathing. It was purely a mechanical thing. A child might have no adenoids and yet breathe through its mouth. His own theory was that to a large extent it was a mechanical factor, due to the absence of the counter-pressure of the tongue and the constant down-drag of the muscles. He thought the members would be grateful to the author if he could touch upon that point in his reply. He noticed that the Peruvian skull had not the contracted arch which was so commonly seen to-day. The arch was smaller in all its dimensions, but the dimensions were of the proper ratio. He thanked the author very heartily for giving such a delightful paper.

Mr. Doubleday said one not uncommonly found in patients who had deficient thyroid glands and symptoms of deficiency of thyroid secretion an absence of the teeth. He had in mind particularly a case that came under his notice six months ago of a girl of sixteen of stunted growth who had many symptoms of deficiency of secretion of the thyroid gland. She had present four permanent lower incisor and upper incisor teeth ; two temporary canines in either jaw, and the premolar teeth absent as far as he could tell. There was also a history of there being temporary molars, and possibly one permanent molar in the jaw. Some of those teeth had been lost earlier and he could not get a definite history of them. About the time she came under his notice she had thyroid extract administered, and some time afterwards the temporary canine, which previously had been firm, became loose, apparently due to an attempt on the part of the permanent canine to erupt. After she had had thyroid extract for nearly five months he was under the impression that the other temporary canine was beginning to get a little loose, and that an attempt was being made by the other canine to erupt. The patient lived in a district where it was rather difficult to get to him, but it was an interesting question whether the administration of thyroid would increase the rate of growth of the teeth as one would expect from the author's observations. The point was one which dental men sometimes had an opportunity of investigating, and service might be rendered by information on the points being noted.

Mr. Carl Schelling asked whether the author had any reason to believe that naturally-fed children were any better off than bottle-fed children in such cases.

The President said that in one of the slides thrown upon the screens, he believed in the case of progeria, there seemed to be a very consider-

able contraction across the premolar region and in the anterior part of the mouth, whereas in the molar region at the back it seemed as if it had developed a little more naturally and normally. That was a condition occasionally seen in cases associated with adenoids, and a somewhat similar condition was frequently seen in the mouths of children who had been mouth breathers. The main contraction was across the premolar region, and perhaps across the first molar region, and the second molars were at a more or less normal distance from one another, *i.e.*, the dimensions across the space between the second molars on the one side and on the other side were more or less normal. But he was not at all sure that that condition of more or less normal growth later on which had produced that condition of the two molars being wider apart had arisen when the child had ceased to be a mouth-breather. He was firmly convinced, and could produce models to prove it, that that condition had arisen where the child had continued to be a mouth-breather right up to adult life.

Mr. H. Baldwin thanked the author for his paper, which he looked upon as a most original and stimulating one. He had attacked the problems *ab origine*, and the author's work would be of the greatest possible use in the future. Attention had been called a great deal lately to the deficiency of the thyroid secretions, and practitioners had been recommended to try thyroid extract in cases of contracted arches. From what he understood of the author's arguments, however, he presumed he would suggest that pituitary extract given internally would be more likely to do good in stimulating the growth of the jaws. It would be of interest if the author would state whether reliable pituitary extract could be obtained, whether it was a safe thing to give, and whether it had been administered in such cases.

Professor Keith, in reply, said he had stated at the beginning of his paper that he did not intend to refer to any finished practical work which was capable of application at present, but simply intended to attempt to explain certain phenomena connected with the growth of bone, because in his opinion the pathology of contracted palate and of irregularities of the teeth was in reality the pathology of bone growth. He was grateful to Dr. Sim Wallace for again raising the question of the action of secretions on bone growth, because he had evidently failed to make his (Professor Keith's) position perfectly clear. He feared some of the members might go away with the idea that he contended that the problems of irregularities of teeth and non-development of the palate were simply due to the failure of secretion. What he had tried to emphasize was that there was some substance in the body which sensitized the growth of the tissues, and that mechanical pressure, the action of chewing, the action of the tongue, the action of the muscles in mastication, and abnormal breathing were mechanical processes or conditions which were acting on the tissues and the result of their influence depended apparently on the fact whether growing tissues were fully sensitized or not. He hoped he had made it clear that, when the members came across a contracted palate, it was not simply a question of giving an extract, it was rather a matter of sensitizing the tissues and then of applying the proper mechanical influences. If the actual sensitizing element of pituitary extract could be discovered, as he hoped it would be, it would then be possible to sensitize the tissues, and to apply with much greater chance of success all the mechanical appliances at present used. With reference to the question of the cause of adenoids, were not they face to face with a matter of which we are at present ignorant ? Beginning at the very beginning, what was the tonsil for ? He did not know, and he did not know anybody who did know. He did not know of any sound evidence

as to the functions of the tonsils ; and he did not know what the lymphoid tissue was for. All he knew about it was that it was present during the years of great growth, and that when maturity was reached it disappeared somehow. There was a very close relationship between the organs of internal secretion and lymphoid tissue, but further than that he could not say. But he thought adenoids and irregularities of the palate were co-related and that a great proportion of the cases were adenoid cases. He was not quite sure, however, that it was wholly a matter of mouth-breathing that gave contracted palate. He thought the proper action of the tongue and the muscles was absolutely essential for the right formation of the palate, but he was also quite sure that besides all of these mechanical influences the tissues must be properly sensitized for normal growth. He did know that in certain conditions the tissues were over-sensitized. In acromegaly they were. He did not know the actual substance that did it. Reference had been made to the giving of pituitary extract. All that he had been trying to open up to the minds of the members were the wide principles along which they ought to think. It was useless to make the statement that the trouble was due to adenoids and mechanical pressure. It was necessary to get deeper than that and to arrive at the principle of bone growth if they were to place the matter on a scientific basis. One point which he had tried to impress upon the members was the extraordinarily complex process underlying the eruption of the teeth. It was not the palate only but the whole face and forehead that were concerned. It was impossible to conceive how two million osteoblastic cells were marshalled to form these structures without being somewhat sensitized and correlated. They were all working together somehow. There was not a providence guiding them, but some other means which regulated their work, and scientific men ought to know all about that process of regulation. All he had done on the present occasion was to bring to their notice certain facts which must be explained. The cases to which he had referred were not seen every day, but only on rare occasions, but they threw light on the points raised. Far from attempting to teach the members present, what he had expected to hear was an extremely clear statement of exactly how mechanical influences caused the teeth to come up into place the regular way in which they usually did. There was not only the overcrowding from deficiency of growth, but also the irregularity in the formation of the alveolar process. He could not help thinking that the food used had something to do with defective maxillary formation. People were not nowadays using their teeth enough and not eating hard enough food. Most of the changes and defects in the jaws and teeth of modern people were apparently due to the modern form of diet ; in all his experience of ancient skeletons he had never seen a skull with a contracted face like his own until he came to comparatively modern times. There could be no doubt that a new condition existed. The change might be due to food, but he wanted to know how the food did it. The results of his enquiries had been to widen the problem and to seek in the living tissues a clue to the conditions of normal growth.

The PRESIDENT having thanked Prof. Keith for the excellent paper he had given and Mr. Sturridge for his casual communication, adjourned the meeting.

ORDINARY MEETING.

An ordinary meeting of the Society was held at No. 11, Chandos Street, Cavendish Square, W., on Wednesday, November 12th, Mr. Mellersh in the chair.

Professor Aldo Maggioni Winderling, of Milan, was elected a corresponding member.

The evening was devoted to "Cases and Problems for Discussion."

An Anti Mouth-Breathing Valve.

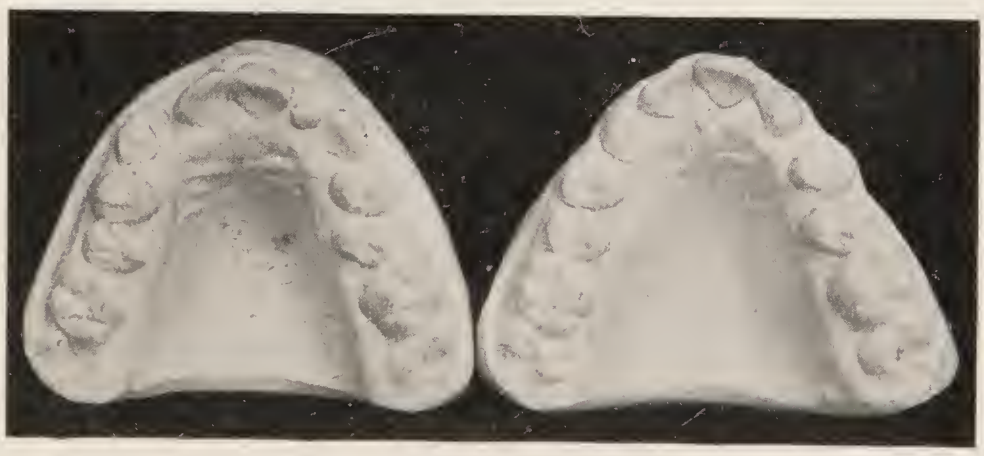
Mr. NORTHCROFT said that he hesitated to burden the Society with this communication, but since the Cambridge British Dental Association meeting he had received one or two enquiries from members of the profession as to how his anti-mouth-breathing valve was made, and evidently some were not familiar with the technique. He would preface his remarks by quoting a passage from the paper read before the Odontological Section R.S.M., in which Mr. W. W. James originally introduced this subject. Mr. James called this anti-mouth-breathing valve a cure for mouth-breathing, and said that "at the present time the procedure for the establishment of nasal respiration consists of operative measures followed by breathing exercises, and, of course, voluntary effort by the patient. In many cases this may suffice, but in a large number mouth-breathing continues. The majority of failures are due to the persistence of a habit which, although controlled during the day, recurs at night when voluntary effort is impossible. It was on account of the failures to establish nasal breathing by operative means that this apparatus had been introduced. By its use one could control the breathing by night as well as by day. Mr. James finished his paper by saying "The apparatus may undergo modifications or be replaced, but the principle applied should, I think, be of value." Mr. Northcroft had not hesitated to modify Mr. James' original design, and he would detail the method he adopted. Mr. James' mouth-breathing apparatus consisted of a wire frame, over which was stretched rubberdam. It was found that the rubberdam perished and patients could not replace it accurately. Sometimes it was too much stretched, at other times it was too loose ; and the edges of the rubber which turned over the tips were pressed on to the mucous membrane and irritated it. Mr. James took impressions of the front of the mouth with the teeth closed, by inserting a sausage-shaped piece of composition between the lips and then moulding it with the hand over the closed lips. The method which he, the speaker, had adopted was to take upper and lower impressions, moulding the front of the mouth extremely high, pressing the composition up well into the sulci. Having taken impressions in that manner, they were mounted in an articulator. The first modification he adopted on Mr. James' design was that he reproduced the condition of the jaws in sleep, *i.e.*, with the teeth slightly apart. Mr. James made the original apparatus with the jaws tightly closed. If one wished to take an impression of the two jaws at the same time, one could do it only by having the mouth tightly closed. In mounting them on the articulator, it was opened to the extent which

An Anti Mouth-Breathing Valve.

Illustrating Mr. G. Northcroft's Communication.

A Case of Missing Superior Laterals.

Illustrating Mr. H. C Highton's Communication.



Illustrating Mr. Wm. Rushton's Communication.

History taking for Orthodontic Cases.

Slide I.

Name.	
No. of case.	31
Date of birth.	June, 1890.
Classification.	11.2 (Angle) Possibly div. I.
Dentition.	$\frac{654321\,|\,123456}{654321\,|\,123456}$
Mutilation.	Removed $\frac{4\,|\,4}{}$ Oct., 1901.
Method of feeding.	
Method of breathing.	Normal.
Method of sleeping.	
Family characteristics.	
Surgical operations.	
Congenital or acquired diseases.	Scarlet fever, July, 1901.
Width of Central Incisor, etc.	9.2 m. m.
Date of first visit.	June 1, 1901.
Date of starting treatment.	June 9, 1901. Abandoned in July, 1901.
Date of first retention.	
Date of removal of retention.	
Total number of visits.	Two.

Date. No. of Model.

Name.	
No. of Case.	82.
Date of birth.	1894.
Classification.	11.1 (Angle).
Dentition.	$\frac{6\ e\ \ c\ 21\,|\,12\ c\ d\ e\ 6\ 7}{6\ e\ d\ \ 21\,|\,12\ \ d\ e\ 6}$
Mutilation.	Too early extraction of $\frac{-\,|\,-}{c\,|\,c}$
Method of feeding.	
Method of breathing.	
Method of sleeping.	
Family characteristics.	
Surgical operations.	
Congenital or acquired disease.	
Width of Central Incisor, etc.	8.6 m. m.
Date of first visit.	May, 1904.
Date of starting treatment.	June, 1904.
Date of first retention.	Arches removed and biting plate inserted Dec., 1904.
Date of removal of retention	Last biting plate removed December, 1907.
Total number of visits.	26 visits while watching the Baker Anchorage, 19 subsequently.

Date.	No. of Model.	
25. V. '04 ..	82	Impressions.
8. VI. '04 ..	,,	Put in upper and lower D. bands.
11. VI. '04 ..	,,	Exam. Reg.
15. VI. '04 ..	,,	,, ,,

Slide No. II.

Name No. Date of Birth. Sex

Dentition

Mutilation

Surgical Operations

Classification Angle Bennett

Date

Aur. Width

,, Nas.

,, Alv. U.

,, ,, L.

,, Ment.

,, Molar

Prosopometer Measurements:

Date	Length of Arch.	Width of Arch.	Height of Arch.	Width of Central Incisor.

Social Conditions.— Medical History of Parents

Prolonged or difficult labour.

Method of Feeding as infant and child.

Type of Food

Congenital and acquired defects and diseases of Infancy and date.

Signs of Internal Secretory Trouble.

Method of Breathing ?

If mouth :—

Cause

Age of onset

Degree

Duration

Power and use of Mastication, as evidenced by mouth and occlusion.

Evidence of present and past Sepsis.

Habits.

Thumb sucking

Finger biting

General Remarks.

one supposed represented the natural relaxation of the jaws. The upper and lower teeth were connected by a sloping piece of wax, to easily facilitate the taking of an impression from the articulated models. A model (such as he exhibited) was then produced, and a zinc made from it, and an aluminium plate, No. 10 in thickness, swedged up, allowing room for the fræna of the upper and of the lower lips. This shield was worn with complete comfort. It had never caused him a sleepless night. It had been stated that this apparatus caused such an excessive flow of saliva as to be positively unpleasant. Though he admitted finding an increased flow of saliva when first wearing it, *i.e.*, for the first night or two, he was never seriously bothered by it, and one soon got accustomed to the sensation of having it in the mouth. He had been extremely interested to note the negative pressure in the mouth on breathing through the nose, when wearing an apparatus like that, which was a perfect valve. If one breathed somewhat rapidly one was conscious of a distinct negative pressure in the mouth, and the valve could be felt coming tight against the mucous membrane, showing what a positive pressure the lips must exert over the front of the mouth, and how easy it is to imagine that a protrusion of the teeth might occur when the mouth was unguarded by the muscle of the lip.

Mr. Badcock said that since Mr. Northcroft showed him the shield he had made one for himself. He wore it nightly, and it added very much to his comfort. He regarded it as an exceedingly useful apparatus.

Mr. Rowlett said he had used two or three such appliances to put into patients' mouths, and he had generally cast them in aluminium, instead of swedging them up. One modification he produced, partly from Mr. James' idea, was to cut a window in front of one which he was putting in for a small boy *æt* 6, who had been in the habit of sucking his thumb, and in consequence got a considerable degree of superior protrusion. He cast four knobs on the side, and over them he stretched the rubber, hoping by that negative pressure to drive those teeth back. He had not seen the child again yet, so did not know how it had answered. He moulded the wax very loosely, and thickened the edge of it, otherwise the plate was too thin to give sufficient rigidity. He ran a bead all round and did not find that patients complained of abrasions.

Mr. Schelling asked whether the apparatus was adopted as an improvement on the old method of elastic straps and head and chin caps figured in text books.

Mr. Mellersh said Mr. Northcroft showed him this modification of Mr. James' appliance at the Cambridge meeting, and it struck him as being particularly admirable. He would now like to know whether the exhibitor had had any trouble with children wearing it. And was there any special difficulty with regard to unwillingness on the part of patients to persist with it ?

Mr. Harold Chapman said he had it in mind to ask the same question as Mr. Mellersh had asked. He would like to hear what were the ages of the patients who had worn it.

Mr. Baldwin said it seemed to him a good idea of Mr. Northcroft's to make the shield fit the teeth in the resting position of the lower jaw while slightly apart from the upper.

Mr. Northcroft replied that he had never prescribed a chin-strap, and doubted its utility in orthodontic work. He had found, as Mr. James said, that in many cases operative measures, such as removal of adenoids or nasal obstruction, sufficed, but in a large number of cases mouth-breathing persisted. He had one or two cases of corrected post-normal occlusion, which had partially relapsed. Such cases did

relapse if equilibrium was not established, and patients continued to breathe through the mouth at night. If one had a child still breathing through the mouth, in spite of adenoids having been removed, this apparatus, he submitted, would help to re-establish the normal breathing. He had not yet been able to test this apparatus on very young children. The youngest patient on whom he had used it was a girl *æt* 14 years. One older patient, who was suffering from periodontal disease, which he, the speaker, thought was due to mouth-breathing, complained rather bitterly about the apparatus, but she continued to wear it, and the objections she first had to it gradually faded away. With regard to Mr. Rowlett's remarks, if one did cast an apparatus one would be careful not to mould the casting wax too closely on to the models. The valve was not swedged up closely to the teeth. It was not necessary to get sharp impressions of the teeth, for then, if the apparatus did move in the mouth, it was likely to cause an abrasion by undue pressure in the wrong place.

A Case of Missing Superior Laterals.

Mr. Highton said: The case which I wish to bring before the Society this evening is one with which I have no doubt you are all familiar, consequently I shall hope to receive information as regards the treatment adopted. The models are of a child aged nine years, and show a marked diastema between the upper centrals, also the frænum labii was thickened and the attachment pronounced. The frænum was dissected away and the appliance suggested by Mr. Northcroft at a recent meeting inserted until the tissue had healed. Platinum squeeze bands with spurs were then inserted to draw the centrals together. Previous to the removal of the frænum, radiograms were taken which show the absence of the permanent laterals on either side. I wish to know whether members would advise leaving the spaces between the centrals and permanent canines until the child is older and then insert a small case to replace the laterals, or whether any member has any other suggestion of successful treatment which he has adopted for a similar case. The articulation appears to be normal apart from a marked overbite, also there is a history of missing laterals on the mother's side for the two previous generations.

Mr. Rowlett said he had had a very similar case. After bringing the centrals together he devitalized both teeth and put in gold inlays with posts down the roots to which were attached dummies, thus filling up the lateral spaces. That had been in four years and at the time of insertion the patient was sixteen years old.

Mr. Badcock said he had a patient at the present time under treatment in whom one lateral was missing, instead of, as in this case, both. In that case there was a space between the centrals and the frænum. He drew the centrals together, and extracted one of the lower incisors, and intended to draw the anterior teeth back, and close up the space between the centrals and the canine. Doubtless the result would not be so artistic as if he had filled up the space of the lateral by some artificial tooth, but he regarded it as a bad thing to start life with a bridge or plate or other mechanical appliance of that sort. He believed such a patient fared better with the loss of a lateral incisor, or even two lateral incisors, and with the centrals touching the canines, than with one of those spaces filled up by a bridge or something of the kind, which had to be begun in early life and worn for the remainder of the patient's days.

Mr. Rushton exhibited models of a somewhat similar case. It was that of a child *æt* 13½, who came to see him and he took the

model at that age. The right upper lateral was the temporary one, and the other was the permanent one. It could be seen that the second bicuspids were impacted. He expanded that arch and got the teeth in very fair alignment, after which he lost sight of the patient for eighteen months. When she returned to him she was fifteen years of age, and the right upper temporary lateral showed signs of loosening. Meanwhile she had discarded the plate, and the teeth, to a certain extent, had gone back. He extracted the loose lateral, and told the patient he thought the permanent lateral would shortly appear. A few months later he found that the central incisors were slowly working round to the right. He had a skiagram taken which showed there was no permanent lateral to be found. He then decided to extract the peg-shaped left permanent lateral. The incisors had slightly moved towards the right, and the peg-shaped lateral was a very unsightly looking object, and so he extracted it, and put in an apparatus to bring forward the canines and the first bicuspids. It could be seen that the canines were drawn close to the centrals. He had not got a model of the finished case, but the appearance was now quite a respectable one. He rounded off the tips of the canines, and ordinary persons would not notice that the girl had lost any teeth, as the first bicuspids had come a little further forward. If he were to have a similar case again, he would take it in hand a little earlier and have the radiograph taken sooner. He thought the case might prove instructive to members.

Mr. Maxwell Stephens said the case which Mr. Rushton had thrown on the screen reminded him of one he met with some years ago. He believed the treatment of these cases was simplified when post-normal occlusion happened to be present, because in that case one could bring the centrals back to the canines, and thus close up the lateral spaces, and the result was quite favourable. In the case Mr. Highton had brought forward, it was important to perform Mr. Northcroft's operation and bring the centrals together, because he considered it was at all times more unsightly to see a girl with a large space between the central incisors, than with a space on either side of them. A case he had met with bearing upon the subject before them, was one in which a strong desire was expressed by the patient's mother to have the balance of the facial contour restored. The girl (aged 13 years) had a strongly moulded chin, but as the upper lateral incisors were missing the development in the premaxillary region was deficient ; this gave the lip an insignificant appearance. The occlusion was perfect, he increased the spaces slightly between the centrals and canines, and made them large enough to insert two small teeth on a gold plate, and thereby the line of the upper lip was very much strengthened. The result, however, of that treatment persuaded him rather to sacrifice appearance than to start off a child with a plate of any fixed appliance, in that he agreed with Mr. Badcock. The child in this case would not wear the plate continuously and consequently the spaces began to close again and the plate became useless.

Mr. Schelling contended that such peg-shaped teeth could be made good-looking. He had recently seen a case in which Mr. Baldwin put a porcelain-faced platinum jacket on such a tooth over fifteen years ago, and it still looked quite well. This was done without cutting the tooth at all and without interfering with the pulp, which was alive.

Mr. Rowlett said that in the case he quoted there was a slight separation between the bicuspid and the canine, and after drawing the centrals together he thought it was out of the question to try to bring them in, for there was plenty of room for a fairly broad lateral to go in. On a future occasion he would not devitalize the tooth, but

put small platinum pins in without devitalization. If it were for himself, he would have his tooth pulled back. For a girl, however, her most important age was from 16 to 25, and if they could have a satisfactory appearance in the mouth until 25, they would be willing to sacrifice a good deal after 40 years of age.

Mr. BALDWIN said he had seen several cases in which the canine had been the missing tooth, and he had made a fixture for each first bicuspid and to each a porcelain canine had been fixed as an extension crown, and the fixture had not required the devitalization of the bicuspid. After he had designed this fixture, he learned about the Carmichael crown, which was not really a crown at all; it was something which fixed on to the tooth, without devitalizing. It was cemented on, and the extension was soldered to it. The following was the way in which he treated the first bicuspids for attaching the canine. He flattened off, to some extent, the mesial and distal surfaces of the tooth (the first bicuspid) and then cut a groove across the fissure, between the two cusps. He afterwards made a very stiff solid $\frac{3}{4}$-ring to go round the tooth, but not going in front; it went mesially, on the distally and on the lingually, and there was a cross piece which fitted into the fissure, connecting the two sides of the $\frac{3}{4}$-ring to strengthen it. That was very rigid, and it had the canine soldered to it, and the whole fixed with cement. He did that for both upper canines, in the case of a brother and sister in whom those teeth were undeveloped, and they were successful. He had done the same thing in a number of other cases. He did not know whether the method could be adapted for a lateral because the leverage would be greater; but if a fixture of that sort were well made and closely fitted, it was astonishing how tightly it held. It was difficult to get it off even before it was cemented. No pressure on the face of the canine would shift it, even before it was cemented. The inner cusp was left normal, while in the Carmichael so-called crown the inner cusp was cut down and covered with gold. He did not join the fixtures together, but made each side quite separate, just an extension from each first bicuspid.

The CHAIRMAN said it was not rare to come across cases in which one or both laterals were suppressed, and it was a very valuable matter for discussion. He called on Mr. Highton to reply.

Mr. HIGHTON replied that he did not think the discussion had brought him much further towards a solution of his case. Between the centrals there was almost enough space for a tooth the size of a lateral tooth. Later there would be almost space for three teeth. The jaw was quite normal, and the arch of average width, consequently he could pull back the centrals or pull forward the canines. But he did not think he could improve the condition very much. There were two good teeth in the front of the mouth. He did not know whether it would be well to devitalize those teeth in front of the mouth, because a dull appearance would be produced there, and there would be four non-translucent teeth instead of two vital teeth. He thought he would wait until the child was older, and insert a case if it were desired to have the missing teeth replaced.

History Taking for Orthodontic Cases.

By MR. GORDON JOHNSON.

Mr. GORDON JOHNSON said: I must apologize for the rather hackneyed nature of the subject I am bringing before you to-night, but as long as etiological problems remain to be solved a plain restatement of principle can do no harm.

May I begin by a quotation from Prof. Karl Pearson's classic work, *The Grammar of Science:* "The classification of facts, the recognition of their sequence and relative significance, and the formation, unbiassed by personal feeling, of a judgment on those facts, a judgment which will be equally true for each individual mind. That is the Scientific Method; the only method by which true knowledge can be obtained."

One feels, in considering what we really know of the etiology of abnormal conditions of the jaws and teeth, that sometimes theories which we accept are theories put forward rather as a suggestion of personal belief, not formed by the strict adherence to the scientific method, and unsupported by any sufficient classification of facts.

Feeling the necessity for material, many Members of this Society, and others elsewhere, have made large collections of models, but we must not forget, as Karl Pearson points out, that it is not only the collection of facts, but the classification of facts which is the material required, and unfortunately it is frequently impossible to accurately classify models unless one has at the time a detailed history of the case. To quote Mr. N. G. Bennett: "What is wanted is more systematized material."

In a paper read before the B.D.A., at Liverpool, in 1910, Mr. Doherty very ably dealt with the problem I am trying to sketch before you to-night, *i.e.*, the necessity and method of collecting suitable data upon which theories may be built.

He exhibited a history chart for general use. Mr. Visick also designed a chart which has been adapted by Mr. Northcroft and shown before this Society. These charts are similar, excepting that Mr. Doherty's contained a line for the Hawley's arch and another for habits, and Mr. Visick's differed in matter of arrangement.

They are all excellent as far as they go, and for one's routine practical work they are probably sufficient, but for collecting data for research I consider there is a lack of space. In each case an effort has been made to cut down the number of headings and space allotted to them in order that the sheet may be reduced to small dimensions.

I feel the mistake has been made in trying to combine in a small book, case-history for scientific research together with the details especially necessary to our practical work.

Slide 1.—This slide shows a pair of charts in actual use by Mr. Northcroft, measuring about 8 in. by 5 in., and we notice that exactly half the space is given over to details of treatment while the general history of the case has been crowded into about 2 inches.

This cramping prevents the inclusion of many points of general history which, however irrelevant they may appear, might, if recorded, help us in some future investigation.

I think, therefore, that a larger and more special chart might be used in cases intended as material for research, where a detailed history would be essential.

It is with this in mind that I venture to bring forward my idea of what such a chart might be, not necessarily to supersede the existing charts, but to be used in addition in cases of special interest as I have just mentioned.

Slide 2.—The chart shown in this slide measures about 8 in. by 10 in. and still, I think, is not at all cumbersome. You will notice several additions, especially the space for progressive Prosopometric Measurements, and also for measurements of the models. I have also left a space for any indication of internal secretory trouble. Mouth-breathing is more definitely dealt with. Sepsis, parental history, habits and the evidence of efficient or inefficient mastication are also introduced, and I have tried to allot to each the requisite space.

I do not claim for this chart any perfection or originality, I only wish it to serve as a basis for discussion, and I hope that by the suggestions of members, progress may be made towards the designing of the perfect chart for this purpose.

Might I suggest that some such form of history chart be officially adopted by the Society, so that the separate work of each individual observer, however small it may be alone, might be correlated to one central design and the Society possess, through its members, a unified classification of material from which much confirmatory and original work might be done.

Mr. Northcroft said he had himself been very interested in charts ever since Mr. Visick introduced the first chart to the Society. In criticising what Mr. Johnson had now brought forward, he noted that it contained that much objected to word "mutilation," which he would like to see abandoned; the second little square could be done away with entirely. If the dentition of the models meant the teeth which were present in the mouth at the time the models were taken, so that the models need not necessarily be referred to, the charts could be used as charts alone for the correlation of data. If the dentition were put down, it was sufficient; it did not matter how teeth had been lost, so long as they were absent. The "prosopometer measurements" could be raised and they had some relation to "auricular width" and "auricular nasal measurement," and so on. He thought it was good to put on the chart the length, width and height of the arch; but it must necessarily be stated on such a chart from what points those measurements were taken, and special calipers were needed. He supposed it was obvious that the width of the central incisor was taken from its widest part, but one *could* measure the incisor from the edge or the neck. It was necessary to clearly define what was meant. The chart was up-to-date in another respect, seeing that it provided for a statement as to the social condition of the patient and the medical history from the parents. He believed few of the members in private practice could, without offence, go into details of a difficult labour, etc. Many times the mother would not necessarily know whether her child was born with a breech presentation or normally. The type of food was, perhaps, a good thing to have on the chart, but it was to be hoped that in a few years the type of food would become standardized, then that item could be eliminated from the chart entirely. The work gradually being done in that line by the Dental and Medical Professions was very good, and the public were becoming alive to the fact that it was necessary to do more for their children than feed them on slop diet if they were to have good dentitions. He did not know whether the general practitioner in dentistry knew enough general medicine to discuss the subject of the effect of the internal secretions on their patients without confirmation by a medical man. He doubted whether such a statement simply put in by the dentist, that the child was suffering from lack of thyroid secretion, would be accepted scientifically. On the whole, he agreed with including in the chart a statement as to the various habits, as well as the method of breathing, and the method of differentiating between the types of breathing was a good idea. He certainly thought such a chart as this would be very useful, when correlated with models, in such work as a Committee of the Society was now sitting to discuss, namely, the ætiology of contracted arches.

Mr. Visick proposed that the upper square be deleted from the chart, and that it be occupied by a diagram of the teeth showing the exact points where measurements were intended to be made, so that anybody else could interpret it. He thought it an improvement on the one he himself brought before the Society. It was also more up-to-date.

Mr. Baldwin said it was excellent to have a chart which all could use and which would receive the imprimatur of the Society. It could be well worked out, and he thought it would be good to appoint a small Committee to go into the question and evolve the best possible charts. He thought there should be a space provided for a history of the temporary dentition, especially with regard to premature extraction of temporary teeth. With regard to Mr. Northcroft's criticism of the space intended for a statement as to the internal secretions, he took it that nothing would be entered in that space unless the dentist had good reason for putting it there ; and any statement he put there he would probably get from the medical man. He would like to see included any history of preparations of the internal secretions having been given as medicine.

Mr. Harold Chapman agreed that the space marked "Mutilation" should be deleted, and in its place he suggested "Dentition, 1, 2, 3, etc." ; that those unerupted be marked with a circle, those which had been lost marked with a cross, and any which were missing from the jaw should receive a *minus* sign. And it might be advisable to add to the words "Method of Breathing," a statement when the nasal breathing became re-established, or it would be better expressed by saying when mouth-breathing actually ceased. And it might be well to show a diagram of the upper arch, indicating where the other measurements should be made—length, height and width of arch. For the last there were needed special instruments, such as Mr. Northcroft had previously shown before the Society.

Mr. Johnson replied that he intended the chart merely as a suggestion in order to try and stimulate other suggestions ; feeling that the idea was good, he thought a useful chart would materialize it. He thanked Mr. Northcroft for his criticisms. He did not himself like the word "Mutilation," but it was difficult to find another word. He agreed with Mr. Baldwin's suggestion : the statement about the internal secretions must come from a doctor, and if it could not be obtained, it must go, but he thought an attempt should be made to record such facts as he had indicated.

A Case of Post-Normal Occlusion Complicated by Deficiency in the Number of Teeth.

Mr. Northcroft had brought the models exhibited, in order to ask the advice of members, as he was puzzled as to what ought to be done. He first saw this child when he was a year old, and he told the mother the child had post-normal occlusion. That was now some years ago. He was an invalid. He next saw the patient when he was eight years nine months old, and he would show the occlusal view of his models then, as well as the profile. The child was bed-ridden from between three and four years of age, until seven. His molar series completely disappeared. He had a very devoted mother, and, under the direction of a dentist, she painted these teeth with nitrate of silver. So, in spite of their being apparently carious, they were hard on the surface and were not septic. As far as he, the speaker, could gather, this child was not suffering from oral sepsis, though he had some marginal gingivitis, due, he believed, to mouth-breathing, and nothing had been done to prevent the mouth-breathing. In January last he saw the child again, and all these temporary teeth were beginning to fail. He realized they were not any good, and removed them all, anticipating that the premolars would be erupting in due course and that then something might be done. To his horror he found that the

canines had erupted the whole width of a tooth away from the laterals, and from the appearance of the jaw he imagined that there were no premolars. He saw the tooth erupting, and at first thought it was a premolar. But in October it proved to be a canine. He had skiagrams of the jaw taken, and these he had brought to exhibit. He had been wondering whether the child had been suffering from some faulty secretion of the ductless glands, as he had a great development of bone at the site of the inter-maxillary suture. The canine, he thought, was in its normal position. The molars were very far forward, and he considered that the premolars ought to come in between the canine and the first molar, and that the four incisors were very much beyond their normal position. The protrusion was now getting markedly worse. He believed the alteration shown was due to pressure of the lower lip. The child's age was now ten years nine months, and the first left lower molar had not erupted more than the anterior cusp. He exhibited stereoscopic views of the whole head, which made evident the absence of the lower second premolars. He would like to hear from members what treatment they would adopt.

Mr. Harold Chapman said he understood Mr. Northcroft to state that the case was one of post-normal occlusion, and yet later he said the molars had moved considerably forward owing, probably, to hyperpituitarism. He would like to know whether the latter was in addition to the post-normality which the exhibitor considered to be present before. If so, it seemed a dreadful state of affairs.

Mr. Baldwin said he had a case which reminded him of the present one, that of a small boy, of very much under-developed frame, and enormous inferior retrusion. When he first saw the boy, the lower central incisors were biting the gum of the palate, and ulcerating it far back behind the upper central incisors. He showed no tendency, at the proper time, to cut the rest of his permanent teeth, and the case looked very hopeless. A biting-plate was inserted which he had worn till now, and it had done him a tremendous amount of good; his lower incisors had gone down, and the biting plate had added very much to his comfort. The mother said the boy at once ate with comfort after the provision of the plate, which he had not been able to do previously, owing to his biting on the palate. The boy was now developing to some extent, but only slowly. He hoped in time to apply reciprocal traction when his molars should have grown; it might eventuate decently yet. In conversation, Mr. Northcroft said a biting-plate in his case would be of no use, as the patient had so little muscular power. In time probably reciprocal traction might do good, and it might be necessary to grind down the cutting edges of the lower incisors.

Mr. Visick said he thought this case brought forward by Mr. Northcroft might be well treated by the adoption of Mr. Rowlett's modification of Mr. Northcroft's anti-mouth-breathing valve, because by its use one might get the upper incisors inside the lower lip, preventing their being protruded further still, owing to lip pressure.

Mr. Rushton said he considered the absence of premolars was quite compatible with a very excellent and efficient arch. He knew a lady of about thirty years of age who solemnly asserted she had never had a tooth extracted, and yet there was absence of the premolars, both upper and lower. She had a perfect arch, though short. No ordinary person would detect that she had been short of a tooth. He agreed with Mr. Visick that it would be better to get back those incisors and wait, giving every chance for the bite to be raised.

Mr. Northcroft replied that what he thought happened was the following: The child had post-normal occlusion. When $\frac{e}{e}|\frac{e}{e}$ were

removed, $\frac{6}{6}|\frac{6}{6}$ came forward still more. But he thought the hyper-pituitarism produced the enormous diastema between the canine tooth and the lateral, that there was a persistence of the inter-maxillary suture, and the bone went on growing, probably due to mechanical stimulation as well. The models bore evidence of that. There was definite growth of jaw bone going on. It was possible that in a diseased child like the present one, there would be persistence of the inter-maxillary sutures. Mr. Colyer had said that in some skulls this suture was not closed until the twelfth year, and possibly this case might be something of the kind. He said that one of the lessons he had learned from this case was the fatuity of trying to extract teeth for the cure of superior protrusion. This child was two premolars short on each side, and some people claimed that they could treat post-normal occlusion of this type in that way. But he did not think it would work. With regard to the suggestion to supply this boy with an anti-mouth-breathing valve, he did not think the mother, who was a Christian Scientist, would allow him to wear it. He was much obliged by the suggestions which had been made, and he would take them home with him and give them careful consideration.

ANNUAL GENERAL MEETING.

THE annual general meeting was held at the Rooms of the Medical Society of London, Chandos Street, Cavendish Square, W., on Wednesday, December 10th, 1913, Mr. MONTAGU F. HOPSON, President, in the chair.

The PRESIDENT announced that the officers and councillors, as nominated by the Council, had been elected, as no variant from the list submitted had been received from members. He therefore declared the following gentlemen duly elected to the respective positions : President, Mr. Norman G. Bennett ; Immediate Past President, Mr. Montagu F. Hopson ; Vice-presidents, Mr. W. Francis Mellersh, Mr. J. E. Spiller, Mr. C. F. Rilot ; Secretary, Mr. Harold Chapman ; Treasurer, Mr. H. C. Highton ; Curator, Mr. B. Maxwell Stephens ; Editor, Mr. Carl Schelling ; Librarian, Mr. J. W. Doherty ; Councillors, Mr. J. Lewin Payne, Mr. Hedley C. Visick, Mr. A. H. Clogg.

TREASURER'S REPORT AND BALANCE SHEET.

The TREASURER (Mr. Highton) presented the Report and Balance-sheet, which was received and adopted, as were also the following Reports of the Hon. Librarian and Curator.

HONORARY SECRETARY'S REPORT.

Seven meetings have been held during the past year ; the average attendance of members and visitors, as gathered from the attendance book, which undoubtedly does not represent the full number, has been 25. The meetings may therefore be considered to have been very satisfactory ; important communications have been presented, including an address by Prof. Arthur Keith. The membership numbers 91, the same as at this period last year.

The Committee considering the "Etiology of contracted dental arches" has found the extent of its deliberation to be so great that it has not yet been able to formulate its report.

It is with regret that your Secretary has to deplore the fact that so few of the newer members take an active part in the work of the Society. The names of original members appear as frequently as formerly on the agenda papers ; one would like to see this spirit growing at a greater pace among the members generally. The Secretary is always glad to hear from members desirous of making communications, although he may not have approached them. The Secretary takes this opportunity to express his sincere thanks to all those who have in any way assisted in making the meetings successful.

HAROLD CHAPMAN.

LIBRARIAN'S REPORT.

There have been but few additions to the library during the past year, probably owing to the fact that the number of books on Orthodontics and its allied subjects is rather limited.

The thanks of the Society are due to members who have very kindly sent copies of current journals, both English and foreign, and various papers, and to the President for an Orthodontical Index extracted from the U.S.A. publication "The Surgeon-General."

Within the course of the next two months there will be a complete set of bound volumes of the Transactions to date, in the possession of the Society, the delay in obtaining these having been due to the copies of the index not coming through from the printers.

Suggestions from members with regard to new books are always welcome. (Signed) J. W. DOHERTY, Librarian.

Messrs. MELLERSH and MALLISON were re-elected auditors.

Mr. HIGHTON added that the sanction had been obtained for the disposal of the Society's lantern, and he would be glad to hear of offers to purchase ; it would go cheap.

The PRESIDENT explained that the offer arose out of the fact that the Society had now no use for the lantern, as the epidiascope was much better for slides and enabled actual specimens to be shown on the screen to the meetings in addition.

The PRESIDENT announced that Sir Arbuthnot Lane found himself unable to be present. He had been called away to America rather unexpectedly, and returned only two days ago, but he had promised to deliver his contribution on some future occasion.

The thanks of the Society were due to the Secretary for securing casual communications, to fill up the evening's session.

CASUAL COMMUNICATIONS.

Expansion Bow.

By Mr. H. BALDWIN.

The ordinary bow which is used for expansion has the effect, when on tension, of expanding the teeth at the back of the mouth, but not so much those in the neighbourhood of the canines, and in protrusion cases the canines are the teeth which, as a rule we most particularly wish to expand. When dealing with these expansion cases I have often felt the need for a bow which allowed expansion in front without removing the bow from the mouth, and as I was unable to find that any bows which would do this were to be bought in the market, I got some bows made in two halves, the two proximal end being screw-cut, one with a right-handed and the other with a left-handed screw. These are connected together by means of a tubular nut, threaded to suit the screws, so that on turning the nut with a pair of pliers the width of the bow is increased in front. To get the proper effect as regards the canines, it is necessary to solder a small stud to the outside of the bow, in such a place as will prevent the ligature wires round the canines from slipping.

The PRESIDENT said he had seen an idea of a somewhat similar nature, but had not used such an apparatus himself. Mr. Baldwin's was ingenious and very useful. It seemed to be an adaptation to the arch, acting something like Mr. Badcock's screw plate.

Mr. VISICK said he believed there was a similar device in a recent catalogue. He thought it could be procured from Messrs. Porro, of New Cavendish Street.

Mr. SPILLER asked whether the arch was for internal or external use. If for internal, he thought it would be useful to have an arch applied for external use also, and expansion was rendered more easy in that way.

Mr. HAROLD CHAPMAN said there were several other forms of divided arch in use, one of which was rather different from that shown by Mr. Baldwin. The centre consisted of a piece of oval tubing, into each end of which fitted a section of an arch ; on each end of the arch there was a nut. One was to go against the end of the oval tube in front, and that replaced Mr. Baldwin's round nut ; the other was to engage the buccal tubes.

Mr. BALDWIN replied that the bow was for external use. He thought an arch like that should be found on the market, and because he had not discovered one he got the instrument makers to construct one.

Two Cases Complicated by Dentigerous Cysts.

By the PRESIDENT.

Earlier in the year Mr. Marsh brought a casual communication relating to an impacted and unerupted lower canine tooth on the left side of the mouth. He brought it before us because of the interesting character of it, inasmuch as it had by working forwards towards the middle line caused the lower incisors to lean across towards the left side owing to pressure on their roots, and to overcome that the lateral incisor tooth on the left side in the lower jaw had been removed in the hope that the lower canine, which was leaning forwards, upwards and inwards, might swing up into place ultimately, or advance so far that it might be pulled into place. The case was interesting too, because two and a half years before the boy had had a dentigerous cyst round the unerupted upper left central incisor, and that cyst I had opened two and a half years ago and treated radically. There has been a sequel to that case. I have been able to watch it, because it was a hospital case which was looked after by Mr. Marsh when he was demonstrating at Guy's. But since the early part of this year the boy started to develop another dentigerous cyst round this unerupted lower canine, and therefore it was necessary for me to remove it a month or two ago, which I did with Mr. Layton's assistance. I have here a radiograph of it shortly before removal. I only brought it forward to-night because we were likely to be short of material, owing to the absence of Sir Arbuthnot Lane. The second case I desire to bring before the Society, as you will see from the radiograph, is that of a dentigerous cyst in the maxilla of a boy aged nine years. It occupied the position of the premolars on the right side. You will notice that the first premolar is directed outwards and that but a very small portion of its root is formed, whilst the second premolar is misplaced upwards and backwards over the roots of the first permanent molar. I imagine that the cyst is connected with the first premolar and that the second has been pushed out of its position during the growth of the cyst. I should be glad of the opinion of the members as to the advisability or otherwise of removing the second premolar when I operate on the cyst to-morrow.

Mr. NORTHCROFT said he would be glad to know if there were marked signs accompanying the presence of the dentigerous cyst, or was there very obvious thinning of the outer alveolar plate in the second case.

Mr. BADCOCK said the case was interesting as touching the development of two cysts in the same mouth. He had had very little experience of dentigerous cysts, but he had noticed the same thing in connection with dental cysts. And not only had he had several cases in which there were more than one cyst in one mouth, but he had in mind a family several of whose members had more than one dental cyst. It looked as if there was a family tendency to the formation of such cysts.

Mr. LEWIN PAYNE said he thought there were a number of cases recorded in which more than one dentigerous cyst had been found in the same mouth. Mr. W. Hern some years ago recorded one in which three such cysts occurred in the mouth of a boy. With regard to the question which had been asked, whether it was possible for one of the teeth connected with a dentigerous cyst to erupt, or to be brought into position, he had only seen one case where a tooth of this nature had found its way into the mouth—he would not say erupted, because it

was rather a process of exfoliation. Ultimately the tooth had to be removed in consequence of the irritation of the new tissue thrown out around it. He did not think a case had been recorded in which a tooth associated with dentigerous cyst had been erupted and had come into its normal position.

The PRESIDENT replied that there was a distinct hard swelling. The swelling was now as large as half a walnut, and at present there was bone over it. The first deciduous molar roots were removed weeks ago. He would like to know what prospect there was of getting that second premolar down into a correct position. He thought the cyst was associated with the first premolar because there was so little development of the root of that tooth. The second premolar had been displaced by the growth of the cyst to its present position. He was hoping to find that the second premolar was outside the cyst wall. He had come across two dental cysts in the same mouth before, but he had not had the experience of Mr. Badcock, of its being a family affair. He knew Mr. Lewin Payne and others had been paying special attention for years to these particular odontomes. He would like to know whether there were any new conclusions to be communicated with regard to the pathology of dentigerous cysts, or whether the old pathology still held the field with regard to the association of these with the follicle wall. It might be that this particular first premolar had not gone on to its full development, and that the cyst wall had been distended, as it were, away from the crown, on the other hand, it might be that the cyst was developed as an aberration or proliferation of remnants of the enamel organ.

Mr. LEWIN PAYNE, in answer to the President, said that after seeing the radiogram, he believed that the trouble was connected with the first premolar, not with the second. With regard to the pathology of these dentigerous cysts, he and his colleagues were of opinion that they were not directly associated with the follicle. They considered that dentigerous cysts were of epithelial origin, and should be regarded as epithelial tumours. They arose from the epithelium associated with the formation of the tooth germ. In reply to a further question, he said he held the opinion that a dental cyst was also an odontome.

Mr. Baldwin said there were certain dental cysts in cases associated with or after chronic alveolar abscess. Those one had been in the habit of calling dental cysts. With regard to the skiagram, there seemed to be an agreement of opinion that it was the first bicuspid which was causing the trouble, and therefore he supposed Mr. Hopson would remove that, probably along with the cyst. With regard to the second bicuspid, if that wanted to come down it was in a rather good position to slide down over the roots of the molar, and therefore it seemed to him that probably the best thing to do would be to let it alone. He would advise letting the second temporary molar alone, and if it got shed it would make a difference. But he thought the second premolar would come down into its place in time. With regard to the lower skiagram, the President said that because the root of the lateral incisor had got absorbed by the presence of the tooth, the bone being exposed, therefore he removed it. He asked whether he thought that was a real reason for removing the tooth. He himself would think not. He would think that if absorption were anywhere near the tip of the tooth, probably there would still be enough root left to hold it in place. In most cases roots seemed to give an excessive hold to a tooth as long as they were healthy, and absorption would not be likely to go on without the buried tooth. He thought it might be desirable to remove the tooth, because it was already in a bad position and on the removal of the cyst it would probably get into a very much worse position, leaning extremely towards the horizontal.

The PRESIDENT replied that removal of the central incisor in the first case brought forward was not determined on solely because the root was absorbed, but partly, and perhaps largely, because he wanted that space for putting his elevator under the crown of the unerupted canine. That required a much smaller wound, and the removal of much less bone. Still, if he had been able to preserve the tooth, he would have taken steps to pull it into a better position, and that would have been done successfully with the canine out of the way. But if it had been left alone it might not have gone over further. There was much cicatricial tissue which would form in that region, and which would go on contracting to some extent. And with the cicatricial tissue contracting, and the pulling of the root of the tooth at the apex, there would be a tendency to pull it into proper position. Years ago he saw radiographs of Mr. May's at a meeting of one of the medical societies, showing the lower central incisors which had drifted apart at their crowns. There happened to have been an abscess round each apex. The roots had been treated, and the abscess condition had cleared up. There was an area which granulated up where the cicatricial tissue was formed, and Mr. May attributed the throwing of the crowns of the teeth to the contracting of the apices of the roots. It occurred to him, the speaker, whether possibly the contraction in the region of the excised cyst might not have pulled the crown up again. He thanked members for the suggestions they had made with regard to his second case. He was particularly anxious about the second premolar, and he would be guided in what he did by what he found on opening the cyst. If it were outside the cyst wall he would leave it, hoping it had nothing to do with the cyst, but he was prepared to sacrifice the first premolar.

A Scheme of Tooth Movement.

By Mr. SPILLER.

I wish to bring forward certain observations regarding the movements of the bicuspid teeth. I believe that when these teeth are free to move in early life they will usually do so, and that the nature of the movement of each tooth, particularly in the upper jaw, is almost constant in character, so much so that in cases where one of them is absent the resultant movement of the adjoining one will largely help to establish its identity. This movement may be the result of the tooth erupting into a space too wide for it, or it may follow the loss of an adjoining tooth. In the upper jaw the movement is usually mostly in the nature of rotation, the first bicuspid rotating in such manner that the inner cusp becomes nearer the centre of the mouth and the buccal cusp more distant. The second bicuspid will usually rotate in the converse direction, the inner cusp moving away from the centre and the buccal cusp towards it. The upper model shown (Fig. Ia) illustrates the typical movement of one bicuspid on each side. In examining a large number of models I have been surprised at the constancy of these movements, a different rotation may sometimes occur when the tooth is deflected by a retained root of either dentition and in the case of the second bicuspid when post-normal occlusion is present. In the lower jaw the movements are not as constant in character and are frequently in the nature of tilting or translation. Some amount of rotation is also common and the usual direction of movement for each bicuspid is an opposite one to that of the corresponding tooth in the upper jaw, thus the first lower bicuspid rotates with its lingual cusp travelling from the centre and the second bicuspid with the lingual cusp towards the centre. The model shown (Fig. Ib) illustrates this

(a) (b)

Fig. 1.

Fig. 2.

To Illustrate Mr. Spiller's Communication.

rotation of the bicuspids and their translation also. I am unable to give any logical explanation of the causation of the movements of these teeth, but suggest it may be due to occlusal forces, although this theory would not explain the fact that when the tooth erupts into a free space it frequently is already rotated.

The PRESIDENT said it was a very interesting anatomical fact, but he could not suggest an explanation. Mr. Spiller might be interested to look into his, the President's mouth later, as he would probably find some verification of his law for he had only erupted, and only possessed, one bicuspid above on each side and one bicuspid below on each side; he was four premolars short. The premolars present in his mouth were the first premolars. He had a brother with two second premolars in the upper jaw absent; they had never been erupted. His, the speaker's, son had been X-rayed, and was found to have one second premolar on the left side absent, not formed at all. His own cusp, which should be the buccal cusp on the left side, had become distal. His lower premolars maintained their positions well.

Mr. NORTHCROFT said he felt much interest in the communication, but he did not follow Mr. Spiller in the ætiology. The author seemed to think it was the occlusive force that caused the rotation of the premolars. He had some models in which the teeth had erupted in a rotated position, and they were not affected by any occlusal force at all. How far they were affected by an anterio-posterior pressure during their eruption he was not prepared to say. But he had models bearing out the interesting fact to which Mr. Spiller drew attention. He would like to know at what age Mr. Spiller contended these premolars rotated after one or other had been removed, because it seemed to be commonsense to conclude that if the occlusion was normal, the teeth would not be rotated.

Mr. CHAPMAN said he would suggest that the canine always came down after the first premolar, and was more frequently outside the arch than inside. Might not that tend to tilt the inner cusp towards the front teeth? *i.e.*, if there was a tendency to crowding in the mouth.

Mr. SPILLER replied that he agreed with Mr. Northcroft's remarks except that when both were erupted and one was extracted, the remaining tooth would usually conform to the rule which he had enunciated, in spite of the occlusion. He thought the suggestion with regard to the canine force was a very likely one. He thought the law would be found to be operative up to adult life, twenty-five years or so.

The Treatment of Arches with no Spacing.

By Mr. SPILLER.

I bring this subject forward in order to get some opinions on the treatment of undeveloped arches at six years of age or so. The best method is to expand the arches as early as possible, but there are certain cases in which one cannot do that. There are cases in which the patient's doctor has forbidden the wearing of appliances, or in which the patient cannot afford, or is out of reach of such treatment. The case shown (Fig. 2) is one of the former kind; the arches have no spacing of the teeth and there is a very large permanent incisor to replace a very small temporary one. One may tell the patient to adopt the habit of vigorous mastication, but that is not always successful, and the question arises whether one should interfere by extraction or not. The temporary central or the temporary central and lateral may be extracted with the idea of removing the four first bicuspids later, but

I am doubtful if one would find sufficient room for the remaining teeth later. Or is it preferable to leave the temporary teeth until they are lost naturally ?

Mr. Norman Bennett said it seemed to him that the chief difficulty one had to combat in these cases was that of the deficient growth of bone in the anterior region at that age. Nothing useful could be done except to encourage the use of the teeth in mastication. To that end, it seemed advisable to extract deciduous teeth as late as possible, *i.e.*, in such a case to leave the central incisors as long as possible, so long as the permanent centrals were not seriously deflected from their proper course. The same remark applied to the laterals. Having got the child to the age of eight or nine, one could judge what the growth of bone was likely to be, and whether one could achieve the best results in the way one would hope, namely, by the extraction of four premolars, because, apart from expansion and growth of bone, the only method of extraction that was likely to be permanently beneficial and leave a good appearance was the extraction of four premolars.

Mr. Baldwin said his practice had been to extract the temporary tooth which corresponded to the erupted permanent one only. The premature extraction of a temporary tooth did not tend to increase the size of the jaw, and each temporary tooth in front of the mouth had to be succeeded by a permanent tooth which was bigger than itself. He did not think it was likely to do good prematurely to extract temporary teeth before their permanent successors arrived.

Mr. Chapman said he would be inclined to remove the temporary teeth as soon as the permanent ones erupted, *i.e.*, two temporary incisors now, to let that one come into place, and remove four premolars, as Mr. Bennett suggested, as soon as there was evidence of crowding in the canine region. It was a case of normal medio-distal relationship, and one wanted to maintain that relation with the teeth that remained ; sacrificing the four cusps would keep the occlusion relatively the same.

Mr. Rushton said that often the dentist was approached by parents who were anxious that they should do something, at an age when it was unwise to do anything ; and it was well not to allow the judgment to be warped by their prayers and intercessions. In such a case as the present he thought it would be well not to do anything just yet. Later on, something more than extraction of two premolars might be necessary ; but it was well to leave the teeth in their places as long as possible, until they were absorbed in the natural way.

Mr. Spiller replied that his opinion coincided with those of Mr Norman Bennett and Mr. Rushton ; but sometimes it was difficult to ignore the requests of the parents. One hoped to see sufficient expansion ; he had one such case in which full expansion took place, and finally the whole complement of teeth were in place.

Practical Points in Fitting Anchor-Bands.

By Harold Chapman, L.D.S.Eng., D.D.S.Penn.

It occurred to me that it might be of interest and help to some to bring this communication before you, as the points I mention have facilitated work considerably and enabled me to obtain a better, a more rapid adjustment of the band to the tooth. One frequently hears complaints as to the difficulty of fitting anchor bands ; I believe that with due care exercised in their selection and preparation before attempting to put them on the teeth, these complaints would disappear. I would first point out that the descriptions as given in the text-books

for the fitting of anchor bands must be rigorously carried out before attempting to put the band on the tooth. Briefly, these are :—

1. To shape the band to the outline of the tooth at the cervical as well as at the occlusal margin of the band.

2. To contour, or pull in, the edges of the band, so that when it (the band) is *in situ* on the tooth, and when the clamping mechanism has been tightened, the edges will, with a minimum of burnishing, fit the tooth closely. At this point I would mention that I consider it to be very rarely necessary to reduce the width of the band (20/100 inch or 5 mm.) or to festoon it in order to place it on the tooth satisfactorily.

The foregoing remarks apply to either plain or clamp bands, and to whichever tooth the band may have to be applied.

It is my intention to deal more minutely with anchor bands for particular teeth. By way of explanation I will say here that I shall consider two types of anchor bands ; the clamp anchor band, having the clamping mechanism on the lingual side of the tooth, and the plain soldered anchor band. I will take them in the following order :— First permanent upper molars, first permanent lower molars, premolars and deciduous molars.

Clamp Bands for First Permanent Upper Molars. The circumference of permanent molars varies within a range of about 8 mm. Clamp bands are supplied in various sizes, the largest having a length of 36 mm. (not including any overlap) and the smallest one of 21 mm. Four bands, intermediate in length, complete the series, the difference between each being 3 mm. They all have a piece of band material, 3·5 mm. long, for overlapping purposes. It is therefore possible to select a band which shall completely cover any tooth varying in circumference from 21 mm. to 39 mm. ; that is any molar or premolar one is likely to wish to use for the attachment of an anchor band.

The anchor tooth having been selected, its circumference is measured. This is conveniently done with Herbst's rings, which are for measuring roots to be crowned. There are twenty rings ranging from 20-40 millimetres in length, the difference between each being 1 mm. With the rings there is a gauge on which the different lengths are marked. In this way there is no difficulty in obtaining a band which is the correct size and one which is actually all closing ; in addition such a band is much easier to fit than one that is too long or too short.

Clamp Bands for First Permanent Lower Molars. The foregoing applies equally to lower permanent molars, but in addition I usually prefer to remove the buccal tube and stretch the cervical edge buccally with Peeso stretching pliers, because of the great convexity of a lower molar in this situation ; by so doing there is also less material to burnish at the occlusal edge of this surface, which has often proved an obstacle to getting an accurate adaptation of the band in this position. I find one of Black's large serrated amalgam pluggers a great help in burnishing in difficult cases ; this instrument does not slip in the way a smooth burnisher will. In turning over the slightly projecting distal edge of the band a strong battle-axe is of great assistance when used as a lever against the approximal tooth.

Clamp Anchor Bands for Premolars. These are prepared exactly as for upper molars, even greater care being exercised in selecting a band of suitable length, because the smaller tooth allows less margin for error.

Plain soldered bands may also be used as anchor bands on premolars. Instead of using the band-forming pliers to make these I prefer to obtain the size of the tooth with Herbst's rings and to make the band rom material 5 mm. wide and .18 mm. thick (metal of this width and

thickness is suitable for all anchor bands for permanent teeth). The band metal should be cut a trifle longer on the cervical edge than the actual measurement so that the edges may be overlapped and united in the manner advocated by Peeso for bands for crowns. By making the occlusal edge shorter than the cervical a better fitting band with less burnishing is obtained. The thickness of anchor band metal prevents its satisfactory use with band-forming pliers.

Clamp Bands for Deciduous Molars. For these teeth I have found that plain soldered bands are very satisfactory as media for anchorage These teeth have their greatest diameter at the cervix and in measuring them with the rings care must be taken to see that the band passes right up to the neck of the tooth. In cutting the band material it should be 1 mm. longer cervically, to allow for overlap for soldering, and 1-2 mm. shorter than the latter occlusally ; this is necessary on account of the decreased circumference of the tooth at the occlusal edge, and enables a well-fitting band to be obtained with a minimum of burnishing. The width of the material in this case is 4·5 mm. If an impression is taken with the bands *in situ*, a sand and plaster cast may be obtained and any necessary attachments soldered to the bands with great accuracy.

The PRESIDENT said members knew Mr. Chapman's skill, and would be prepared to accept what he said on these points.

Mr. NORTHCROFT asked if Mr. Chapman was in the habit of using pinch bands for temporary molar teeth, and no clamp bands. In the majority of cases, he thought a clamp band was much better than a pinched band.

Mr. BALDWIN said it was useful to bend the screw, so that it formed a concavity towards the gum, for that brought the edge of the band closer, and prevented its tendency to slip off. In forcing them down over six-year lower molars, which were only partially erupted, when it had to go between gum and teeth, he always tried to keep the band screwed up as tightly as possible, and by gradually unscrewing it as it went down it hugged the tooth closely.

Mr. CHAPMAN replied that he had recently used plain bands almost entirely, in place of clamped bands for temporary molars ; their shape is particularly well suited to this type of band. He showed one on a tooth which was removed the previous day, and he doubted whether one could be shown that fitted better. When one had selected a band of suitable size, the bending of the screw with a concavity towards the gum did not enter into consideration. At most it could only be a length of less than 3 mm., so in the majority of cases the point raised would not actually arise. He gave the cervical edge an excess of pulling in, so that, although the band was well unscrewed, those edges would grip the side of the tooth, as it was pressed over it and carried into place. After the buccal tube was removed, he always stretched the buccal side of the clamp band before putting it on.

The PRESIDENT then delivered the following valedictory address.

President's Valedictory Address.

Gentlemen, time brings many changes, they occur quickly enough in the outside world, more swiftly still in the restricted sphere of a Society like our own. A year has passed and the time has come for me to make my adieux. Following the excellent example of my predecessors, I do not propose to say more than a few words. I entered the office which you were pleased to bestow upon me with a deep sense of my unworthiness, I leave it with regret. This does not imply that I have modified my view of my own fitness (indeed, I am more conscious

than ever of the fact that I must remain a learner still), but the generous support accorded me on all sides has made my year of office not only an easy one, but a real pleasure. Thanks to the keenness displayed by members we have not lacked material for study and discussion, and the average attendance at our meetings has been good. I cannot name individually those who have rendered us their debtors, by reading papers and by bringing forward interesting casual communications, but I cannot refrain from expressing our thanks to that distinguished visitor, Professor Keith, for the able and fascinating paper which he read at our October meeting. The mere fact that so eminent a scientist should thus display his interest in the efforts and aims of a young Society, like our own, is a matter of which we may well be proud.

Our Research Committee, which is considering the question of the "Causation of contracted arches," has found the subject so vast and so far-reaching that progress has been seemingly slow, and it has been decided to keep the scope of the enquiry within certain definite limits, for the time being, but I have no doubt that the committee will accumulate, ultimately, material sufficient in quantity and of undoubted authenticity, upon which to base certain definite conclusions. One cannot dwell upon the past, without looking forward to the future. The coming year must be a momenteous one for British dentistry, in all its branches. The meeting of the Sixth International Dental Congress in London, in August, should engage the attention and secure the active support of all our members. The Section of Orthodontics will be, undoubtedly, one of the most important of the Congress, and under the presidency of Mr. Badcock who, I need not remind you, was the first president of our own Society, it will prove a great success, of this I am quite sure. I trust that all our members will rally to the support of this section.

Finally, I am but expressing the feelings of all of you, as well as my own, when I allude to the services so readily given by our excellent officers. Mr. Highton, who takes such good care of our purse, Mr. Schelling, who so ably edits our Transactions, and who so kindly affords us all an opportunity of correcting our mis-statements, before they appear in print ; our Secretary, who really runs the Society. I have had to do with a good many secretaries in my time, but I have never met with one whose heart was more in his work, or who possessed better qualifications for his office than Mr. Chapman.

It only remains for me to ask my old friend and colleague Mr. Norman Bennett to take the chair, and in welcoming him to the chair I can wish him nothing better than that his year of office may prove as happy and as congenial as mine has been.

Mr. NORMAN BENNETT was then inducted into the chair. He said it would be an anti-climax, after Mr. Hopson's eloquent address, to attempt to deliver an oration, but later on he would have something to say.

Mr. BALDWIN proposed a hearty vote of thanks to the retiring president and the officers of the Society for their services during the past year, which had been a very successful one, and that was entirely due to the activity and zeal of the officers.

Mr. RUSHTON seconded, remarking that under Mr. Hopson's auspices the Society had had one of the most successful sessions in its history, also due to the fact that he had a good crew under him. The officers were imbued with a sense of their work, and were keen in doing it. Mr. Chapman had the rare gift of sincerity, tact and all that went to the making of a good secretary.

Carried by acclamation.

Mr. CHAPMAN briefly acknowledged the vote.

The PRESIDENT announced the next meeting for January 14th.

THE BRITISH SOCIETY FOR THE STUDY OF ORTHODONTICS.

STATEMENT OF ACCOUNTS from December 1st, 1912, to November 30th, 1913.

1911-12.			RECEIPTS.			1912-13.		
£	s.	d.				£	s.	d.
			To Balances brought from last account :					
50	2	0	Cash at Bank			81	0	10
1	5	4	Cash in Hand			0	15	6
91	7	0	Subscriptions Received during Year ..			93	9	0
1	6	0	Hire of B.S.S.O. Lantern..			—		
£144	0	4			£175	5	4	

1911-12.			PAYMENTS.			1912-13.		
£	s.	d.				£	s.	d.
15	15	0	By Rent			15	15	0
12	12	0	Reporting			12	12	0
13	16	1	Printing and Stationery			8	15	1
7	4	0	Transactions			15	18	5
4	5	0	Lantern Accessories			—		
			Hire of Epidiascope and Operator's Fee			3	8	0
0	13	1	Lantern Slides, etc.			4	5	6
5	1	6	Refreshments			5	3	6
2	17	4	Postage, 'Phone, and Sundry Expenses			1	17	7
62	4	0				67	14	11
81	16	4	Balances carried to next account :					
			Cash at Bank			106	8	4
			In Hand :					
			Hon. Secretary	19/9½				
			Hon. Treasurer, ...	2/3½				
						1	2	1
£144	0	4			£175	5	4	

We have examined the Books and Vouchers and certify the above Statement of Accounts to be correct.

Signed—W. F. MELLERSH,
H. C. MALLISON,
Hon. Auditors.

List of Members of the British Society for the Study of Orthodontics.

Aubrey, H. P.	40, Curzon Street, Mayfair, W.
Austen, Leslie G.	Cambridge House, Portsmouth.
Badcock, G. W.	32, Brunswick Place, Hove.
Badcock, J. H.	140, Harley Street, W.
Baldwin, H.	37, Cavendish Square, W.
Barrett, Russell	41, Harley Street, W.
Bascombe, E. D.	Melford Lodge, Bourne Avenue, The Square, Bournemouth.
Bennett, F. J.	17, George Street, Hanover Square, W.
Bennett, Norman G.	50, Brook Street, W.
Blaaberg, Charles J.	27, Tavistock Square, W.C.
Bowes, J.A.	28, South Side, Clapham Common, S.W.
Briault, E. H. L.	145, Finchley Road, N.W.
Brown, J. R.	40, Bridge Street, Uttoxeter.
Bryan, Hermann	26, St. Giles Street, Norwich.
Bull, F. B.	Guy's Hospital, S.E.
Campion, G. G.	264, Oxford Road, Manchester.
Campkin, Hugh T.	71, Harley Street, W.
Chapman, Harold	15, Upper Wimpole Street, W.
Chapman, Ralph	76, Grosvenor Street, W.
Clarence, Thomas H.	24, Upper Wimpole Street, W.
Clogg, Arthur H.	18, Central Hill, Upper Norwood, S.E.
Cribb, H. E.	15, Stratford Place, W.
Denham, N.	29, Albemarle Road, Beckenham.
Densham, Ashley B.	18, Stratford Place, W.
Doherty, J. W.	101, Worple Road, Wimbledon.
Edey, G. Russell	Jasmine Cottage, Chislehurst.
Farmer, F. M.	St. Winifred's, Hampton, Middlesex.
Fernie, J. G.	Holmleigh, Murray Road, Northwood, Middlesex.
Field, George	117, Park Street, W.
Forty, A. Alan	26, Park Square, Leeds.
Friel, Sheldon	71, Lower Baggot Street, Dublin.
Goldie, George J.	95, Merrion Square, Dublin, Ireland.
Green, W.	South View, 10, North Common Road, Ealing, W.
Heath, Robert H.	2, Park Crescent, Portland Place, W.
Henry, P. F.	79, King William Street, E.C.
Highton, Herbert C.	17, Upper Wimpole Street, W.
Hopson, Montagu F.	64, Harley Street, W.
James, W. W.	2, Park Crescent, Portland Place, W.
Jeffery, Louis	1, Newton Villas, Finsbury Park, N.
Johnson, Arthur W.	71, Grosvenor Street, W.
Johnson, Gordon	115, Harley Street, W.
Knaggs, S. A.	21, Rosslyn Hill, Hampstead, N.W.
Knowles, C. Heygate	15, Worsley Road, Hampstead, N.W.
Lacey, A. G.	Stedham House, Surbiton.
Layton, G.	12, rue Belliard, Bruxelles (Corresponding Member).
Lees, C.	Breifond, Boyne Road, Tunbridge Wells.
Lockett, A. C.	Hereford House, 117, Park Street, W.
McBride, John	26, Duke's Avenue, Muswell Hill, N.
McKechnie, J. D.	29, Queen Anne Street, W.

List of Members—continued.

Maggioni Windering, Professor Aldo	Via Manzoni 45, Milan, Italy (Corresponding Member).
Malleson, H. C.	30, Thurlow Road, Hampstead, N.W.
Marsh, H. E.	1, Cantelupe Road, Bexhill, Sussex.
Mason, E. N.	Sandown, 306, Broadway, Bexley Heath.
Matheson, Leonard	22, Wimpole Street, W.
Mathews, E. F. Cale	60, Newhall Street, Birmingham.
May, Walter J.	24, Upper Wimpole Street, W.
Mellersh, W. Francis	28, Wimpole Street, W.
Morgan, Reginald C.	15, Woodsome, Totnes Road, Paignton.
Morris, C. S.	47, Upper Brook Street, Grosvenor Square, W.
Northcroft, George	115, Harley Street, W.
Parfitt, J. B.	179, King's Road, Reading.
Pavitt, P. G.	57A, Wimpole Street, W.
Payne, J. L.	18, Portland Place, W.
Pearce, F. J.	57a, Wimpole Street, W.
Philpots, Montague	14, High Street, Windsor.
Pollitt, G. Paton	50, Brook Street, Hanover Square, W.
Porteous, Hugh T.	15, Cavendish Place, W.
Preedy, E. J.	1, Hanover Square, W.
Rilot, Chas. F.	22, Wimpole Street, W.
Rowlett, A. E.	165, London Road, Leicester.
Rushton, W.	32, Harley Street, W.
Samuel, B. Barnett	76, Wimpole Street, W.
Schelling, C.	37, Cavendish Square, W.
Scobie, James	145, Finchley Road, N.W.
Scott, P.	1, The Mall, Wanstead, N.E.
Scott, T.	1, Bishop's Mansions, Fulham Palace Road, S.W.
Shattock, Chas. R.	Saville House, Sutton Court Road, Chiswick, W.
Shore, H. D.	37, Parliament Street, S.W.
Spiller, J. E.	64, Worple Road, Wimbledon, S.W.
Spokes, P. Sidney	4, Portland Place, W.
Stephens, B. Maxwell	76, Grosvenor Street, Grosvenor Square, W.
Sturridge, Ernest	29A, Wimpole Street, W.
Tattersall, Harold	1, Sandwell Mansions, N.W.
Tebbitt, E. R.	4, Frant Road, Tunbridge Wells.
Thew, W.	140, Harley Street, W.
Thomson, George	38, Harley Street, W.
Turner, J. G.	59, Wimpole Street, W.
Turner, V. E.	Prince of Wales Road, Norwich.
Visick, Hedley C.	29, Queen Anne Street, W.
Wallace, Dr. J. Sim	150, Harley Street, W.
Watson, A. MacDonald	3, Redcliffe Parade West, Bristol.
White, Ernest	394, Glossop Road, Sheffield.
Wood, Bryan J.	7, London Road, Kettering.

Honorary Member.

Bogue, E. A.	63, West 48th Street, New York, U.S.A.